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T. F. Nazarova investigated the electric properties of semiconductor glass types in the TlSe - As_2Se_3 system.

B. T. Kolomiyets spoke of research work in the field of inner photoelectric effect done by T. N. Mamontova.
B. V. Pavlov discussed experimental results of the position of the absorption boundary as dependent on the change of composition of glass types.
V. P. Pozdnev reported on material he obtained in the investigation of the viscosity of glass types in the As_2Se_3 - As_2Te_3 system.

B. T. Kolomiyets summarized the working results obtained by the Physicotechnical Institute and found that in the materials investigated the short-range order is not changed in the transition from the vitreous into the crystalline state.
O. V. Mazurin, Leningradskiy khimiko-tekhnologicheskiy institut (Leningrad Chemicotechnical Institute) described the investigation of the semiconductor properties of silicate and borosilicate glass types with the addition of iron-cobalt and titanium oxides.

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24 (4)
AUTHORS: Kolomiyets, B. T., Mamontova, T. N. SOV/20-125-1-18/67

TITLE: Internal Photoeffect in Molten Chalcogenide Glass
(Vnutrennyy fotoeffekt v rasplavlennom khal'kogenidnom stekle)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 1, pp 73-74 (USSR)

ABSTRACT: The authors were interested not only in the existence of the internal photoelectric effects in the molten phase but also in the possibility of bringing evidence of the conservation of the structure of the short-range order in the transition of the vitriform semiconductors under investigation from the solid into the liquid phase by melting. The invariability of the spectral distribution on the transition into the liquid phase may indeed be indicative of the conservation of the short-range order, and also measurements of the temperature dependence of conductivity (Ref 4) point to it. A vitreous semiconductor of the composition 4 $As_2Se_3 \cdot As_2Te_3$ was chosen for the experiment. The measurements were made in a container provided with platinum electrodes. The internal photoeffect in the substance investigated remains conserved on the transition through the softening temperature, and the absolute value of

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photoconductivity remains practically unchanged in the whole temperature range investigated (i.e. from 26 to 184°). A diagram shows the final results obtained from the experiments. With a temperature exceeding the softening temperature by 28 to 30° photoconductivity does not change considerably. At 184° the material investigated behaved as a typical liquid. A further increase in temperature intensified the "noise", which rendered measurements more difficult. The experimental result obtained from the investigation under review proves the existence of an internal photoeffect in molten substances, which points to the conservation of the usual properties of matter in the liquid state, as long as the character of the interaction between the elements being present in the substance investigated is not changed considerably. The absence of variations in the spectral distribution is indicative of the conservation of the short-range order in the temperature range investigated. The observed shift of characteristics may be caused by the temperature dependence of optical absorption. There are 1 figures and 5 references, 3 of which are Soviet.

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

Internal Photoeffect in Molten Chalcogenide Glass

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR
(Physico-technical Institute of the Academy of Sciences, USSR)

PRESENTED: November 19, 1958, by A. F. Ioffe, Academician

SUBMITTED: November 17, 1958

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

5(4)
AUTHORS: Ivanov-Omskiy, V. I., Kolomiyets, B. T. SOV/20-127-1-36/65

TITLE: Dependence of the Width of the Forbidden Zone on the Composition of the Solid Solution in the System InSb - GaSb (Zavisimost' shiriny zapreshchennoy zony ot sostava tverdogo rastvora v sisteme InSb - GaSb)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 1, pp 135-136 (USSR)

ABSTRACT: Experiments made by other research workers on this system (Refs 2, 3) took place with InSb-GaSb alloys, whose homogeneity was not safely ascertained; hence, measuring results could not be interpreted quantitatively. Solid single-phase alloys were therefore prepared, whose homogeneity was checked by X-ray and microstructural analysis. Permeability was measured with the infrared spectrometer IKS-14. On the strength of measurements made the boundary of the absorption band was determined. Figure 1 shows that the width of the forbidden zone rises steadily but non-linearly with rising GaSb content in the alloy. Figure 2 illustrates this dependence in another connection. The ordinate is given by the wavelength corresponding to the

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67258
SOV/20-129-4-20/68

AUTHORS: Kolomiyets, B. T., Lyubin, V. M.

TITLE: Some Specific Features of the Photoelectric Effect in Amorphous Layers of Arsenic Triselenide

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 4, pp 789 - 792 (USSR)

ABSTRACT: The properties of arsenic chalcogenides, i.e. the analogs of antimony have hitherto not been investigated. Publications have so far been giving only very scarce results of investigations of the crystalline layers of As_2Se_3. The present article describes the first results obtained by investigating the substances of this group, which were found on arsenic triselenide layers. The As_2Se_3 was synthetized from elements having the following purity degrees: Se 99.998%, As 99.99...%. The layer was produced by vaporizing in a vacuum at a pressure of $p = 10^{-5}$ to 10^{-6} mm Hg onto polished glass bases (which have previously partly been coated with a semitransparent conductive film of Pt, Au, Al, or SnO_2). The As_2Se_3 layers had a thickness of

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Some Specific Features of the Photoelectric Effect in Amorphous Layers of Arsenic Triselenide

0.5 to 2 μ. Onto this layer, semitransparent electrodes made from Al, Au, or Ag were applied in vacuum, so that the properties could be investigated "transversely" to the layer. The layers As_2Se_3 have an amorphous structure. The dark carriers were holes. In the course of longitudinal measurements $\varrho_d = 10^{11} - 10^{12}$ Ohm.cm was found for the specific dark resistance, and in measurements transversal to the layer $\varrho_d = 10^{12} - 10^{13}$ Ohm.cm was found. The layers had a high photoconductivity which surpassed that of the Sb_2S_3 layers. In the measurements carried out along the layers no photoelectromotive force existed. However, in transversal measurements a photoelectromotive force was always observed, and it attained a value of $\mathcal{E} = 0.4$ v. The photoelectric effect in the As_2Se_3 layers had low viscosity. Besides, several interesting features of the photoelectric effect were observed in the As_2Se_3 layers, as e.g. a temperature dependence of the photoelectric current and

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a spectral distribution of photoelectric sensitivity. A diagram shows the dependence of the photoconductivity logarithm and of the temperature conductivity upon the reciprocal temperature in longitudinal measurements. The dark conductivity and, at low temperatures, also photoconductivity increase exponentially with increasing temperature. At higher temperature photoconductivity decreases with increasing temperature. This may be due to the variation of the recombination conditions (increase of the recombination rate) of the current carriers. The exponential increase at low temperatures is, according to the authors' opinion, due to the "adhesion" of light-induced current carriers. The barrier mechanism and the exciton mechanism are, as the authors believe, only little probable. In transversal measurements the course of the spectral distribution curve of the photoelectric effect depends to a considerable extent on the polarity of the applied voltage. In the case of some samples the sign of the photoelectromotive force also depended on the wave length. The authors also produced samples with a common lower electrode (covered with Al) and with different upper electrodes (Al and Au). In the case of illumination coming from the direction of the

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KOLOMIYETS, B.T.

PHASE I BOOK EXPLOITATION SOV/5035

Vsesoyuznoye soveshchaniye po steklobraznomu sostoyaniyu. 3d, Leningrad, 1959.

Stekloobraznoye sostoyaniye; trudy Tret'yego vsesoyuznogo soveshchaniya Leningrad, 16-20 noyabrya 1959 (Vitreous State; Transactions of the Third All-Union Conference on the Vitreous State, Held in Leningrad on November 16-20, 1959) Moscow, Izd-vo AN SSSR, 1960. 534 p. Errata slip inserted. 3,200 copies printed. (Series: Its: Trudy)

Sponsoring Agencies: Institut khimii silikatov Akademii nauk SSSR. Vsesoyuznoye khimicheskoye obshchestvo imeni D.I. Mendeleyeva and Gosudarstvennyy ordena Lenina opticheskiy institut imeni S.I. Vavilova.

Editorial Board: A.I. Avgustinik, V.P. Barzakovskiy, M.A. Bezborodov, O.K. Botvinkin, V.V.Vargin, A.G. Vlasov, K.S. Yevstrop'yev, A.A. Lebedev, M.A. Matveyev, V.S. Molchanov, R.L. Myuller, Ye.A. Poray-Koshits, Chairman, N.A. Toropov, V.A. Florinskaya, A.K. Yakhkind; Ed. of Publishing House: I.V. Suvorov; Tech. Ed.: V.T. Bochever.

PURPOSE: This book is intended for researchers in the science and technology of glasses.

COVERAGE: The book contains the reports and discussions of the Third All-Union Conference on the Vitreous State, held in Leningrad on November 16-19, 1959. They deal with the methods and results of studying the structure of glasses, the relation between the structure and properties of glasses, the nature of the chemical bond and glass structure, and the crystallochemistry of glass. Fused silica, mechanism of vitrification, optical properties and glass structure, and the electrical properties of glasses are also discussed. A number of the reports deal with the dependence of glass properties on composition, the tinting of glasses and radiation effects, and mechanical, technical, and chemical properties of glasses. Other papers treat glass semiconductors and soda borosilicate glasses. The Conference was attended by more than 300 delegates from Soviet and East German scientific organizations. Among the participants in the discussions were N.V. Solomin, Ye. V. Kovshinskiy, Yu.A. Gastev, V.P. Pryanishnikov, Yu. Ya. Gotlib, O.P. Mchedlov-Petrosyan, G.P. Mikhaylov, S.M. Petrov, A.N. Lazarev, D.I. Levin, A.V. Shatilov, N.T. Ploshchinskiy, A.Ya. Kuznetsov, N.V. Degtyareva, G.V. Byurganovskaya, A.A. Kalenov, M.N. Skornyakov, P.Ya. Bokin, E.K. Keller, Ya.A. Kuznetsov, V.P. Pozdnev, R.S. Shevelevich, Z.G. Pinsker, and O.S. Molchanova. The final session of the Conference was addressed by Professor I.I. Kitaygorodskiy, Honored Scientist and Engineer, Doctor of Technical Sciences. The following institutes were cited for their contribution to the development of glass science and technology: Gosudarstvennyy opticheskiy institut (State Optical Institute), Institut khimii silikatov AN SSSR (Institute of Silicate Chemistry, AS USSR), Fizicheskiy institut AN SSSR (Physics Institute AS USSR), Fiziko-tekhnicheskiy institut AN SSSR (Physicotechnical Institute AS USSR), Institut fiziki AN BSSR, Minsk (Institute of Physics, Academy of Sciences, Belorusskaya SSR, Minsk), Laboratory of Physical Chemistry of Silicates of the Institut obshchey i neorganicheskoy khimii AN BSSR, Minsk (Institute of General and Inorganic Chemistry, Academy of Sciences, Belorusskaya SSR, Minsk), Institut vysokomolekulyarnykh soyedineniy AN SSSR (Institute of High Molecular Compounds, AS USSR), Gosudarstvennyy institut stekla (State Institute for Glass), Gosudarstvennyy institut steklovolokna (State Institute for Glass Fibers), Gosudarstvennyy institut elektrotekhnicheskogo stekla (State Institute for Electrical Glass), Sibirskiy fizikotechnicheskiy institut, Tomsk (Siberian Physicotechnical Institute, Tomsk), Leningradskiy gosudarstvennyy universitet (Leningrad State University), Moskovskiy khimikotekhnologicheskiy institut (Moscow Institute of Chemical Technology), Leningradskiy tekhnologicheskiy institut im. Lensoveta (Leningrad Technological Institut imeni Lensovet), Belorusskiy politekhnicheskiy institut Minsk (Belorussian Polytechnic Institute, Minsk), Novocherkasskiy politekhnicheskiy institut (Novocherkassk Polytechnic Institute), and Sverdlovskiy politekhnicheskiy institut (Sverdlovsk Polytechnic Institute). The Conference was sponsored by the Institute of Silicate Chemistry AS USSR (Acting Director - A.S. Gotlib), the Vsesoyuznoye khimicheskoye obshchestvo im. D.I. Mendeleyeva (All-Union Chemical Society imeni D.I. Mendeleyev), and the Gosudarstvennyy ordena Lenina opticheskiy institut imeni S.I. Vavilova (State "Order of Lenin" Optical Institute imeni S.I. Vavilov). The 15 resolutions of the Conference include recommendations to organize a Center for the purpose of coordinating the research on glass, to publish a new periodical under the title "Fizika i khimiya stekla" (Physics and Chemistry of Glass), and to join the International Committee on Glass. The Conference thanks A.A. Lebedev, Academician, Professor, and Chairman of the Organization of Committee; Ye.A. Poray-Koshits, Doctor of Physics and Mathematics, Member of the Organizational Committee; and R.L. Myuller, Doctor of Chemical Sciences, Member of the Organizational Committee. The editorial board thanks G.M. Bartenev, M.V. Vol'kenshteyn, L.I. Demkina, D.P. Dobychin, S.K. Dubrovo, V.A. Ioffe, and B.T. Kolomiyets. References accompany individual reports.

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Kolomiyets, B. T.

S/072/60/000/03/021/023
B003/B008

AUTHOR: Syritskaya, Z. M.

TITLE: 3rd All-Union Conference on the Vitreous State

PERIODICAL: Steklo i keramika, 1960, Nr 3, pp 43-46 (USSR)

ABSTRACT: The 3rd All-Union Conference on the Vitreous State was held in
Leningrad at the end of 1959. It was organized by the Institut
khimii silikatov AN SSSR (Institute of the Chemistry of Silicates
AS USSR), Vsesoyuznoye khimicheskoye obshchestvo imeni D. I.
Mendeleyeva (All-Union Chemical Society imeni D. I. Mendeleyev)
and Gosudarstvennyy opticheskiy institut imeni S. I. Vavilova
(State Optical Institute imeni S. I. Vavilov). More than 100
reports on the structure of glass, investigation methods of the
vitreous state, the mechanism of vitrification and physicochemical
and technical properties of glasses were delivered. The Conference
was opened by Academician A. A. Lebedev. Fundamental investigation
methods and results concerning the glass structure were discussed
at the 1st meeting. Academician A. A. Lebedev reported on possibili-
ties and results of optical methods, Ye. A. Poray-Koshits on the
diffraction method, K. S. Yevstrop'yev on general problems con-
cerning structure and properties of glasses. The 2nd meeting produced
5 reports on the problem of the vitreous state: R. L. Myuller,
"Chemical Peculiarities of Polymeric Vitreous Materials and the

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Nature of Vitrification"; N. A. Goryunova and B. T. Kolomiyets,
"On the Problems of Conformities of the Vitrification"; L. V. Tarasov,
"Glass as a Polymer"; A. N. Deuval'ter, "Theory of Glass Structure";
A. G. Vlasov, "Natural Oscillations of the Glass Lattice". The 3rd
meeting produced 9 reports on investigation results of silicate
melts and on problems of the mechanism of vitrification: A. I.
Avgustinik, "On the Problem of the Formation of the Crystalline
Phase From the Silicate Melt"; O. K. Botvinkin, "Process of Vitri-
fication and the Structure of Glass"; B. M. Lepinskikh, O. A. Yesin
and V. I. Musikhin, "On the Structure of Melts"; I. T. Sryvalkin
and O. A. Yesin, "Thermodynamic Properties of the Silicate Systems
FeO - CaO - SiO$_2$ and CaO - Al$_2$O$_3$ - SiO$_2$"; G. M. Bartenev, "Mechani-
cal and Structural Vitrification"; M. V. Vol'kenshteyn, "Mechanism
of Vitrification". At the 4th meeting, 13 reports dealt with problems
of the glass structure and optical investigation methods: V. A.
Florinskaya, "Infrared Reflection Spectra of Sodium Silicate Glasses
and Their Relations to the Structure"; Ya. S. Bobovich and T. P. Tulub,
"Smekal-Raman Dispersion of Light and the Structure of Some Silicate
Glasses"; V. A. Kolesova, "Investigation of the Vibrational Spectra
of Aluminosilicate Glasses"; N. N. Sobolev reported on the work of
the Fizicheskiy Institut AN SSSR (Institute of Physics AS USSR) with

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the help of infrared spectrophoto-
glasses from one component, with the help of infrared spectrophoto-
metry and the Smekal-Raman dispersion; T. A. Sidorov reported on
the molecular structure and the properties of the crystalline quartz;
S. N. Brekhovskikh and V. P. Cheremisinov reported on structural
investigations of lead- and bismuthborate glasses with the aid of
infrared spectroscopy; A. G. Vlasov, "The Quantitative Relation of
the Orderly and Irregular Phase in Glass"; G. O. Bagdyk'yants and
A. G. Alekseyev, "Electronographic Investigation of the Structure
of Glasses"; N. A. Voyshvillo, "On the Structure of a Sodium-boron-
silicate Glass Submitted to Enduring Thermal Treatment"; N. S.
Andreyev, V. I. Aver'yanov, N. A. Voyshvillo, "Structural Inter-
pretation of the Anomal Dispersion of the Visible Light in Sodium-
boron-silicate Glasses". At the 5th meeting, 9 reports dealt with
the investigation results of sodium-boron-silicate glasses. A. A.
Appen and Gan' Fu-Si, "Boron and Alumoboron Anomaly of the Proper-
ties of Silicate Glasses"; Ye. I. Galant, "On the Coordination Num-
bers of Aluminum and Boron in Some Glasses"; S. P. Zhdanov reported
on structural changes in boron-silicate glasses; Ye. A. Poray-Koshits
and S. P. Zhdanov reported on some controversial problems concerning
the structure of boron-silicate glasses and their porous products;
Ye. A. Poray-Koshits and N. S. Andreyev, "Submicroscopic Inhomo-
geneities in the Structure of Complex Glasses". The 15 reports at

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

Kolomiyets, B.T.

S/072/60/000/03/021/023
B005/B008

AUTHOR: Syritskaya, Z. M.

TITLE: 3rd All-Union Conference on the Vitreous State

PERIODICAL: Steklo i keramika, 1960, Nr 3, pp 43-46 (USSR)

ABSTRACT: The 3rd All-Union Conference on the Vitreous State was held in Leningrad at the end of 1959. It was organised by the Institut khimii silikatov AN SSSR (Institute of the Chemistry of Silicates AS USSR), Vsesoyuznoye khimicheskoye obshchestvo imeni D. I. Mendeleyeva (All-Union Chemical Society imeni D. I. Mendeleyev) and Gosudarstvennyy opticheskiy institut imeni S. I. Vavilova (State Optical Institute imeni S. I. Vavilov). More than 100 reports on the structure of glass, investigation methods of the vitreous state, the mechanism of vitrification and physicochemical and technical properties of glasses were delivered. The Conference was opened by Academician A. A. Lebedev. At the 5th meeting, 9 reports dealt with the investigation results of sodium-boron-silicate glasses. A. A. Appen and San' Fu-Si, "Boron and Alumoboron Anomaly of the Properties of Silicate Glasses"; Ye. I. Galant, "On the Coordination Numbers of Aluminum and Boron in Some Glasses"; S. P. Zhdanov reported on structural changes in boron-silicate glasses; Ye. A. Poray-Koshits and S. P. Zhdanov reported on some controversial problems concerning the structure of boron-silicate glasses and their porous products; Ye. A. Poray-Koshits and N. S. Andreyev, "Submicroscopic Inhomogeneities in the Structure of Complex Glasses". The 15 reports at

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the 6th meeting dealt with the electric properties of glasses. L. M. Belyayevskaya reported on the structure determination of glass with the aid of an inhomogeneous electric field; N. N. Vereshchagin and V. I. Odelevskiy, "Structure and Properties of Some Oxide Glasses in the Light of the Polymer-theory of the Vitreous State"; R. L. Myuller reported on the agility and the degree of dissociation as functions of the ionic and atomar composition of the glass; V. I. Odelevskiy reported on the nature of dielectric losses in glasslike and crystalline aluminosilicates; V. P. Petrosyan, "Investigation of the Dielectric Polarization and the Losses in Phosphate Glasses"; V. A. Presnov, V. I. Caman and L. N. Krasil'nikov reported on investigations of the conductivity of glasses in electric high-tension fields, K. K. Yevstrop'yev on the diffusion of Na^{22} and K^{42} in some silicate glasses, V. A. Ioffe, I. B. Yanchevskaya and G. I. Khvostenko on electric properties of crystalline and glasslike aluminosilicates. O. V. Mazurin spoke on his studies which were carried out under the supervision of Professor K. S. Yevstrop'yev at the Kafedra stekla LTI imeni Lensoveta (Chair for Glass of the Leningrad Technological Institute imeni Lensovet) in the report: "The Dependence of the Electroconductivity of Glasses on the Chemical Composition". V. A. Khar'yuzov, O. V. Mazurin and N. N. Bakkova gave investigation results on the specific electroconductivity of glasses of the system $SiO_2 - B_2O_3 - BaO$ in the temperature range of from 400-1300° and on the influence of additions

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of aluminum- and zinc oxide on the electric conductivity of these glasses. At the 7th meeting, 6 reports dealt with glasses as semiconductors, 9 with the coloring of glasses and the influence of radiation and 4 reports with technical properties of glasses. V. A. Ioffe and G. I. Khvostenko, "Electric Properties of Some Semiconductor Glasses". B. T. Kolomiyets, N. A. Goryunova and V. P. Shilo reported on methods for the production of chalcogenide glasses, on some of their general properties and on the limits of the vitreous state in the systems $Tl_2Se - As_2Se_3$, $Tl_2Se - Sb_2Se_3$, $Sb_2Se_3 - As_2Se_3$, Tl - As - Se. B. T. Kolomiyets and B. V. Pavlov reported on the optical absorption in a number of binary chalcogenide systems. B. T. Kolomiyets, T. F. Mamontova and G. P. Nazarova reported on the electron conductivity of chalcogenide glasses. A. A. Vaypolin, Ye. A. Poray-Koshits, "Radiographic Investigation of the Structure of Vitreous Arsenic Chalcogenides". V. V. Tarasov and V. A. Romanovskiy reported on the chain structure of the vitreous arsenious sulphide determined by them with calorimetric measurements. K. P. Azarov reported on structure and properties of ferrous boron glasses and

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

Kolomiyets, B. T.

report to be presented at the 1st Intl Congress of the Intl Federation of Automatic Control, 25 Jun-5 Jul 1960, Moscow, USSR.

BYKHOVSKIY, M. L. - "Ultra stability in electronic calculating devices in the solution of nonlinear equations in indefinite form"
CHELYUSTKIN, A. B. - "Use of calculating devices in systems for the automatic control of rolling mills"
CHICHINADZE, V. K. - "Concerning some problems of the organization of self-adjusting and self-teaching systems of automatic control, based on principles of random search"
DAVYDOV, E. I. - "Development of automatic control systems for boiler units"
DUDNIKOV, Ye. G. - "Determination of optimum adjustments of industrial automatic regulation systems according to initial data obtained from experience"
DUB'YE, A. I., and ROZENVASSER, E. N. - "Methods of organizing Lyapunov functions in the theory of nonlinear regulating systems"
DRUZHININ, N. N. - "Balanced regulation and inter-communications of a multi-motor electric drive and technology in continuous rolling mills"
FEL'DBAUM, A. A. - "Problems of statistical theory of automatic optimization systems"
FEYGIN, V. I. - "Automation of a reversible cold rolling mill for nonferrous metals"
FILIPPOV, A. F. - "Application of the theory of differential equations with a discontinuous right side to nonlinear problems of automatic regulation"
GAVRILOV, M.A. - "Structural surplus and operational reliability of relay devices"
GANKIN, M. Z. - "Automation of irrigation systems"
[illegible], G. E., [illegible], V. E., KOSTENKO, M. P., NEYMAN, L. R., and [illegible], E. S. - "Power regulation of disturbance and problems of the stability of electric power systems"
GINZBURG, S. A. - "Logical method of synthesis of functional converters"
IL'IN, V. A. - "Methods of transmission of information and the structure of telemechanical systems for dispersed structures"
INOSOV, V. L., and LUTSKIY (fnu) - "The code-impulse system of telemeasurement for dispatched operations of trunk-line gas pipe lines"
IVAKHNENKO, A.G. - "Concerning the application of the theory of combined regulation systems for cybernetic adaptation systems"
KARANDEYEV, K. B., and SHTAMBERGER, G. A. - "A quasi-equilibrated bridge as an element in a system of automatic control"
KAZAKEVICH, V. V. - "Concerning the process of extra regulation of inert objects in the presence of disturbance"
KAZAKOV, I. E. - "Some problems of the theory of statistical linearization and its application"
KILIN, F. M. - "Some problems of the theory of impulse systems with time selectors"
KOBRINSKIY, A. E., BOLKHOVITIN, S. V., VOSKOBOYNIKOV, L.M., IOFFE, D. M., POLYAN, E. P., POPOV, B. P., SLAVUTSKIY, Ya. L., SYSIN, A. Ya., and YAKOBSON, Ya. S. - "The problem of bioelectric control"
KOLOMIYETS, B.T. - "New types of photo resistances and their field of use"
[illegible], M.L., [illegible], B. G., and SHUMILOV, K. A. - "System of automatic control and regulation of blast distribution in the tuyeres of blast furnace"
KOROBOCHKIN, B. L. - "Investigation of the dynamics of the hydraulic duct of a copying lathe"
KRASOVSKIY, A. A. - "Dynamics of continuous systems of automatic regulation with extra self-adjustment of corrective devices"
KRASOVSKIY, N. N. - "Concerning the selection of parameters of optimum stability systems"
KUKHTENKO, A. I. - "The dynamics of devices imitating living organisms"
KULEBAKIN, V. S. - "The invariant theory of automatic regulation and control systems"
LANIN, I. D. - "Pneumatic calculating devices as a means of insuring the reliability of complex automation systems"
LAZAREV, V. G., and PARKHOMENKO, P.P. - "Mechanization of processes of analysis and synthesis of the structure of relay devices"

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

S/081/61/000/021/048/094
B151/B101

AUTHOR: Kolomiyets, B. T.

TITLE: Semiconducting glasses

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 21, 1961, 306, abstract 21K253 (Sb. "Stekloobrazn. sostoyaniye". M.-L., AN SSSR, 1960, 449 - 454. Diskus., 478-479)

TEXT: Several works of Soviet investigators in the field of chalcogenic glasses (with compositions containing S, Se, or Te) are reviewed. Brief summaries of the results obtained from the study of new groups of oxide and chalcogenic glasses are given. A program of work in this field for the future is set out. [Abstracter's note: Complete translation.]

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15.2640

S/058/61/000/008/026/044
A058/A101

AUTHORS: Kolomiyets, B. T., Mamontova, T. N., Nazarova, T. F.

TITLE: Electric properties of chalcogenide glasses

PERIODICAL: Referativnyy zhurnal, Fizika, no. 8, 1961, 199, abstract 8D76 (V sb. "Stekloobrazn. sostoyaniye". M.-L., AS USSR, 1960, 465-470, disc. 478-479)

TEXT: Data on the electric conductivity, activation energy and intrinsic photoeffect of various chalcogenide glasses (I) are given. All the investigated glasses have p-type conductivity that is preserved in the solid and molten states and are typical semiconductors. The character of the variation with composition of the electric properties and of a number of physicochemical properties is the same as in systems of solid substitution solution of crystalline substances. Incident to crystallization of (I) the conductivity increases very sharply. Incident to crystallization of a number of these glasses the close order remains constant. It was established that impurities that are electrically active in the crystal are inactive in a glass produced from a melt of this crystal.

[Abstracter's note: Complete translation]

D. Mazurin

Card 1/1

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

S/125

S/181/60/002/01/06/035
B008/B011

24.7100

AUTHORS: Kolomiyets, B. T., Pozdnev, V. P.

TITLE: Vitreous Semiconductors. 7. Viscosity of Vitreous Semiconductors of the System As_2Se_3 - As_2Te_3

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 1, pp. 28 - 34

TEXT: The authors investigated the temperature dependence of viscosity in chalcogenide glasses. They tested glasses of As_2Se_3 - As_2Te_3, whose properties are partly known. With a view to determining the temperature dependence of viscosity and its temperature course at different compositions, the compositions specified in Table 1 were studied in the system concerned. The apparatus used for measuring viscosity was similar to the one described by A. R. Regel' in his dissertation (Ref. 6). The errors in measurement did not exceed 5%. The results obtained from the measurement of the absolute values of the kinematic viscosity in the temperature range 400-800°C are compiled in Table 2. Fig. 2 is a graph depicting the temperature dependence of the logarithm of the kinematic

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Vitreous Semiconductors. 7. Viscosity of Vitreous Semiconductors of the System As_2Se_3 - As_2Te_3

viscosity in °C for glasses of the system As_2Se_3 - As_2Te_3 of three different compositions. Another graph in Fig. 3 illustrates the dependence of the logarithm of kinematic viscosity on the composition at 425 and 690°C. The calculated values of the activation energy E and of the activation entropy S of the viscous flow are specified in Table 3. Fig. 4 shows F = f(T) (F = free activation energy of the viscous flow) for glasses of the system As_2Se_3 - As_2Te_3. The following statements are made on the strength of data obtained: 1) The absolute values of the kinematic viscosity of semiconducting chalcogenide glasses of the system As_2Se_3 - As_2Te_3 lie at temperatures of about 400°C in the range 10^2 - 10^{-1} stokes, and at temperatures of ~700°C in the range 10^{-1} - 10^{-2} stokes. 2) The viscosity of all glasses of the system under consideration drops steadily in the investigated temperature range with a temperature rise, namely, in such a way that E of the respective glass remains stable for any temperature. 3) On the transition from

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B008/B011

Vitreous Semiconductors. 7. Viscosity of Vitreous Semiconductors of the System As_2Se_3 - As_2Te_3.

composition As_2Se_3 to composition $As_2Se_3 \cdot As_2Te_3$, viscosity drops gradually with the given temperature. 4) The free activation energy of the viscous flow steadily drops with a rise in temperature, and the more so the higher the Te-content in the glass. 5) On the transition from As_2Se_3 glass to $As_2Se_3 \cdot As_2Te_3$, E shows a tendency to decreasing. 6) The glasses have a positive S which lies in the range 7.2 - 8.75 cal/mole.deg. Fig.5 shows the structure of As_2Se_3 glass, and Fig. 6 the structure of the glasses in the system As_2Se_3 - As_2Te_3. On comparing the semiconducting chalcogenide glasses of the system As_2Se_3 - As_2Te_3 with oxide glasses, the authors ascertained the following differences: The softening temperatures of semiconducting glasses are lower, and the absolute value of their viscosity is considerably smaller as compared with oxide glasses. The work was done with the participation of L. S. Kir'yanova, graduate student of LGU (Leningrad State University). Moreover, mention

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

Vitreous Semiconductors. 7. Viscosity of Vitreous Semiconductors of the System As_2Se_3 - As_2Te_3

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B008/B011

is made of Ye. G. Shvidkovskiy, Priss. V. V. Tarasov, and Khuan Si-khuay. Table 1 specifies the softening temperatures of glasses of the system As_2Se_3 - As_2Te_3 measured by V. P. Shilo. There are 6 figures, 3 tables, and 9 references: 8 Soviet and 1 German.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut AN SSSR (Leningrad Institute of Physics and Technology, AS USSR)

SUBMITTED: April 5, 1959

Card 4/4

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

S/181/60/002/01/12/035
B008/B011

AUTHORS: Kolomiyets, B. T., Lyubin, V. M.

TITLE: On the Mechanism of Photoconductivity in Amorphous Chalcogenide Layers

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 1, pp. 52 - 54

TEXT: The authors investigated the dependences of the photocurrent on exposure at increased temperatures and the temperature course of the photocurrent in a wide exposure range on a semiconductor layer. Amorphous Sb_2S_3- and, in part, As_2Se_3 layers were used for the purpose. The results obtained can be evidently extended also to other amorphous photoconductive layers, above all, other antimony and arsenic chalcogenides. The methods applied were the same as those of Refs. 1-3. Fig. 1 illustrates typical lux-ampere characteristics of amorphous layers at different temperatures. The presence of two gradients at room temperature was explained by the assumption of two recombination mechanisms which occur in CdS samples. Fig. 2 shows typical dependences of

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On the Mechanism of Photoconductivity in Amorphous Chalcogenide Layers

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B008/B011

the photocurrent logarithm on the inversion temperature, that were taken at different exposure values on the photoconductor. Experimental data indicate that photocurrents in amorphous photoconductive layers show two opposite tendencies with a rise in temperature. The exponential temperature dependence of the effective carrier mobility is dealt with in Refs. 9 and 10. In amorphous photoconductive layers the second mechanism described in Ref. 10 seems to prevail. This is the steplike mechanism which is characterized by a discontinuous motion of the carriers, due to their "adhesion". The investigations carried out point to a complicated mechanism of the internal photoeffect. An important conclusion reached here is that the investigation of the temperature course of the photocurrent can serve as a simple method of determining the position of the adhesion levels in amorphous photoconductive layers. V.K. Kocherov, graduate student of LGU participated in the work. A.F. Ioffe is mentioned (Ref. 10). There are 2 figures and 10 references: 4 Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut AN SSSR (Leningrad Institute of Physics and Technology AS USSR)

SUBMITTED: August 31, 1959

Card 2/2

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

S/181/60/002/01/31/035
B008/B014

AUTHORS: Kolomiyets, B. T., Lin' Tszyun'-tin

TITLE: Spectral Distribution of the Intrinsic Photoeffect in the ZnSe-CdSe System

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 1, pp. 169-170

TEXT: For the purpose of studying the spectral sensitivity during the transition from one structure to the other the authors synthesized eight compounds with the following components: ZnSe, 4ZnSe . CdSe, 2ZnSe . CdSe, ZnSe . CdSe, ZnSe . 2CdSe, ZnSe . 3CdSe, ZnSe . 4CdSe, and CdSe. The synthesis was carried out in evacuated quartz ampoules above the melting point. In addition to the lattice parameters published by N. A. Goryunova, V. A. Frank-Kamenetskiy, and N. N. Fedorova (Ref. 1), the authors performed an X-ray structural analysis of the substances synthesized. The results given in Table 1 are in close agreement with Ref. 1. Further, the Table shows that the interface between two systems of solid solutions is found at a CdSe content of more than 50%. Spectral curves of all compounds are

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reproduced in Fig. 1. It may be seen that the spectral sensitivity is gradually shifted with a change in composition. For the purpose of determining the width of the forbidden zone, the authors calculated the activation energy from $\lambda_{max}/2$. The final results are represented in Fig. 2, which shows that the activation energy in the system under consideration changes continuously. Though no distinct change in the activation energy of the carriers was observed during the transition from one structure to the other, this transition manifests itself in the varying shape of the spectral curve within the short-wave region. Fig. 1 shows that all spectral characteristics may be divided into two groups according to their shape, and that the interface is distinctly marked during the transition from the structure of sphalerite to that of wurtzite. The authors thank I. N. Ageyeva and R. V. Struchalina for having carried out the X-ray structural analysis. There are 2 figures, 1 table, and 2 references: 1 Soviet and 1 German.

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Spectral Distribution of the Intrinsic Photoeffect in the ZnSe-CdSe System

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ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut AN SSSR (Leningrad Institute of Physics and Technology, AS USSR)

SUBMITTED: July 24, 1959

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

S/181/60/002/01/33/035
B008/B014

24.7700

AUTHORS: Kolomiyets, B. T., Hazarova, T. F.

TITLE: The Part Played by Impurities in the Conductivity of Vitreous As_2SeTe_2

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No.1, pp. 174-176

TEXT: The authors studied the part played by impurities in vitreous and crystalline substances of the same composition. They chose $As_2Se_3 \cdot 2As_2Te_3$ (As_2SeTe_2) for this purpose. When the melt of this substance is slowly cooled it crystallizes, and it becomes vitreous when it is suddenly cooled. This substance was produced from high-purity elements, and was additionally purified by zonal recrystallization. A table lists the mean values of the conductivity of glasses and crystalline As_2SeTe_2 immediately after synthesis and zonal recrystallization. It may be seen that after zonal fusion has been carried out the conductivity of the crystalline substance is lowered by three orders of magnitude and passes

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The Part Played by Impurities in the Conductivity of Vitreous As_2SeTe_2

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from the p-type to the n-type. The electrical properties of vitreous As_2SeTe_2, however, remain unchanged. The conductivity of the crystalline material has a different temperature dependence before and after zonal fusion. The activation energy of the impurity centers, determined from temperature characteristics, amounts to 0.4 ev. The temperature dependence of the conductivity of vitreous material is not influenced by the degree of purity. It is characterized by the activation energy of the 1.0-ev carriers. The temperature characteristics of crystalline and vitreous As_2SeTe_2 are shown in the figure. There are 1 figure, 1 table, and 4 Soviet references.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut AN SSSR
(Leningrad Institute of Physics and Technology, AS USSR)

SUBMITTED: August 1, 1959

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

81774

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B006/B067

5.4110

AUTHORS: Goryunova, N. A., Kolomiyets, B. T., Shilo, V. P.

TITLE: Vitreous Semiconductors. 9. Vitrification in Complex Chalcogenides on the Basis of Arsenic Sulfide and Selenide

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 2, pp. 280-283

TEXT: In investigating binary chalcogenides on the basis of sulfur and selenium it was observed that the elements of the 5th group - phosphorus and arsenic in this case - which have no vitrifying properties when alloyed with selenium and sulfur, easily form glass in a wide concentration range with essential deviations from the stoichiometric ratio. Also alloys of phosphorus and arsenic chalcogenides with chalcogenides of other elements of this group (antimony, bismuth) form glass. Chalcogenides of any other element proved to have no vitrifying properties under the experimental conditions of the authors, neither alone nor in alloys. The only exception is germanium. The chalcogenides of the elements of the 5th group are called vitrifying and those of the 1st - 4th group (with the exception of Ge) non-vitrifying. Vitreous substances were

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Vitreous Semiconductors. 9. Vitrification in Complex Chalcogenides on the Basis of Arsenic Sulfide and Selenide

also obtained by fusing chalcogenides of the elements of the 5th group with chalcogenides of the elements of other groups. Furthermore, the authors investigated the influence exercised in such melts by non-vitrifying chalcogenides on the vitrifying capability of the melt of the two (interacting) chalcogenides. Melts on the basis of arsenic sulfide and selenide were produced with the sulfides and selenides of the elements of the 1st - 4th group (except for B, Al, C, and Si). The syntheses were made in the concentration ranges of ~5 mole% of the ternary systems Me - X - As, where Me is an element of the first four groups, X - sulfur or selenium. The vitrification of the systems As - Se - Me is illustrated by phase diagrams for the elements of the groups I - IV in Figs. 1-4. The sulfides yielded similar results. Figs. 5 and 6 show the experimental results in the form of diagrams which illustrate the ratio between the vitrification ranges of all elements from Cu to Pb. In conclusion, the results are briefly discussed and compared with those of Zachariasen and Winter-Klein. There are 7 figures and 4 references: 3 Soviet and 1 American.

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81348
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B006/B017

24.7600

AUTHORS: Ivanov-Omskiy, V. I., Kolomiyets, B. T.

TITLE: Electrical Properties of the Equimolecular Alloy InSb-GaSb

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 3, pp. 388-394

TEXT: The investigations described in the present paper were conducted with coarsely crystalline n-type and p-type samples produced by zonal leveling at low velocities. The n-type samples had a carrier concentration of $(1.5 - 3)\cdot10^{15}$ cm^{-3} and the p-type one of $(7 - 8)\cdot10^{16}$ cm^{-3}. The samples had the shape of parallelepipedons ($12 \cdot 3.5 \cdot 1.5$ mm^3). The temperature dependence of their conductivity (σ) and Hall coefficient (R) was measured (Fig. 1) by O. V. Yemel'yanenko's method. In the range of natural conductivity, the curves for n-type and p-type samples run parallel. The ratio between electron and hole mobility was determined from the temperature dependence of the Hall effect, and was found to be $b = \frac{u_-}{u_+} = 20$. Fig. 2 shows the results of a joint measurement of the

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Electrical Properties of the
Equimolecular Alloy InSb-GaSb

temperature dependence of σ, R, thermo-emf (α) and of the coefficients of the longitudinal ($Q^{\parallel}$) and transverse ($Q^{\perp}$) Nernst-Ettingshausen effect in an n-type sample with an electron concentration of $2.10^{15} cm^{-3}$. The results of the investigations were analyzed according to the individual fields. The position of the Fermi surface was directly determined from measurements of the thermo-emf, without taking into account the contribution of the holes which is estimated to be 5%. Fig. 3 shows the temperature dependence of the reduced Fermi level. A large number of data are given for the carrier mobility. The Hall mobility of the electrons changes with temperature according to the law $u_x = u_o T^{-1.2}$, in the case of electron-phonon scattering $u \sim T^{-1.5}$ according to theory. For InSb $u \sim T^{-1.7}$ was found experimentally. The simultaneous measurement of $Q^{\parallel}$ and $Q^{\perp}$ at low temperatures yields a value of 1.5 for the exponent. The electron mobility measured was 35,000 $cm^2/v.sec$ at room temperature; hence, $u = 0.85 \cdot u_x$ = $= 0.85 \cdot 35{,}000 = 30{,}000$ $cm^2/v.sec$. The hole mobility at the same temperature is found at $\simeq 600$ $cm^2/v.sec$. The width of the forbidden zone ΔE and its temperature dependence $d\Delta E/dT$ were determined for three

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Electrical Properties of the Equimolecular Alloy InSb-GaSb

samples from the Hall effect as being 0.42±0.02 ev (0°K), and $-(4.0\pm0.5)\cdot10^{-4}$ev/deg, respectively, according to measurements of optical absorption at 300 and 77°K. At room temperature, the width is 0.33±0.01 ev. The effective carrier mass was determined by measuring the thermo-emf and the Hall effect: electron mass $(0.04 \pm 0.01)m_0$, hole mass: $(0.25 \pm 0.5)\ m_0$. In a Table, the results are compared with those obtained for pure InSb and GaSb. In conclusion, the authors thank L. V. Kradinova for the production of the initial materials, and O. V. Yemel'yanenko for his assistance in the measurements. There are 5 figures, 1 table, and 10 references: 4 Soviet, 2 US, 2 British, 1 Canadian, and 1 German.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR Leningrad (Institute of Physics and Technology of the AS USSR, Leningrad)

SUBMITTED: June 17, 1959

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Card 3/3

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81349

S/181/60/002/03/03/028
B006/B017

24.7600

AUTHORS: Kolomiyets, B. T., Nazarova, T. F.

TITLE: II. Hall Effect in Vitreous Materials of the System $Tl_2Se.As_2(Se,Te)_3$

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 3, pp. 395-396

TEXT: In this paper, the authors present the first results obtained from investigations of the Hall effect in amorphous semiconductors. Because of their high electrical conductivity materials of the system $Tl_2Se.As_2(Se,Te)_3$ were chosen. It was between 10^{-3} to 10^{-9} ohm^{-1}cm^{-1}, depending on the Te content. The measurements were made by means of an ИНХ-1 (INKh-1) instrument resembling a Hall voltmeter; the Hall effect was measured by the well-known method in variable electric and magnetic fields. This instrument permitted measurements in the resistivity range $10^{-1} \div 10^{-5}$ ohm^{-1}cm^{-1}. The Hall voltage was measured in the range 0.2 - 3,000 μv, the maximum magnetic field strength attained 1,800 oe. The samples were parallelepipedons of 12 • 4 • 1.5 mm. Fig. 1 illustrates

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II. Hall Effect in Vitreous Materials of the System $Tl_2Se.As_2(Se,Te)_3$

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the final results of the measurements; it was found that with increasing tellurium concentration the carrier concentration increases monotonically (from $5 \cdot 10^{11}$ to $6 \cdot 10^{17}$ cm^{-3}) and, accordingly, conductivity as well. The data refer to room temperature. Fig. 2 shows the dependence of mobility on the composition. If the sign of the carrier is determined from the sign of the thermo-emf, result differs from the determination of the carrier sign from that of the Hall effect: in the former case, p-type, and n-type in the latter. It may be concluded from the results that the change in conductivity with the composition of vitreous semiconductors of the system investigated, which is brought about by the change in concentration and mobility of the carrier, is very low. Similar conditions are expected for other vitreous semiconductors. V. Ogorodnikov, graduate student of LGU (Leningrad State University), assisted in the work. There are 2 figures and 4 Soviet references.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR Leningrad (Institute of Physics and Technology of the AS USSR, Leningrad)

SUBMITTED: August 1, 1959

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Kolomiyets, B.T.

81955
S/181/60/002/04/14/034
B002/B063

24.3900
AUTHORS: Kolomiyets, B. T., Pavlov, B. V.

TITLE: Vitreous Semiconductors. VIII. The Optical Properties of Thallium, Arsenous, and Antimonious Chalcogenide Glasses

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 4, pp 637-643

TEXT: The systems (Tl - As- Sb) - (S - Se - Te) form semiconductive glasses in a wide range (Fig. 1). These glasses can be penetrated by infrared light up to about 60 to 80%. In this paper, absorption spectra of 35 binary and two quaternary glasses are studied between ~1 and 18 μ. The samples were prepared by fusion or pressing. Absorption depends, to some extent, on the mode of preparation method, as was shown by tests performed with As_2S_3 (Fig. 2). The following systems were studied (some of the absorption curves are depicted): As_2S_3 - As_2Se_3, five compounds (Fig. 3); As_2Se_3 - As_2Te_3, ten compounds (Fig. 4); As_2Se_3 - Tl_2Se, two compounds (Fig. 4); As_2Se_3 - Sb_2Se_3, three compounds (Fig. 4); As_2S_3 - As_2Te_3, two compounds (Fig. 6); As_2S_3 - Tl_2S, two compounds (Fig. 6); As_2S_3 - Sb_2S_3, two compounds

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Vitreous Semiconductors. VIII. The Optical Properties of Thallium, Arsenous, and Antimonious Chalcogenide Glasses

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B002/B063

(Fig. 6), and moreover, the two compounds $As_2Se_3.Tl_2Se.3Tl_2Te.3As_2Te_3$ and $Tl_2(Te_{0.5},Se_{0.5}).As_2Te_3$ (Fig. 4), as well as seven samples of $As_2Se_3.As_2Te_3$ with varying tellurium contents (Fig. 7). The absorption limits of these glasses are 610 and 3,500 mμ (Table). The content of As_2S_3 and As_2Se_3 is essential for the optical properties. As_2S_3 glasses are characterized by the decrease of their absorption bands at 4.2 and 6.5 μ; As_2Se_3 glasses frequently show the characteristic absorption band at 12.5 μ. The authors thank V. P. Shilo for his assistance in the synthesis of the materials. There are 7 figures, 1 table, and 7 references: 4 Soviet and 3 American.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR, Leningrad
(Physicotechnical Institute of the AS USSR, Leningrad)

SUBMITTED: March 24, 1959

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15.2000 1153, 1145, 1142

S/063/60/005/005/008/021
A051/A029

AUTHOR: Kolomiyets, B.T., Professor

TITLE: Glass-Like Semiconductors

PERIODICAL: Zhurnal Vsesoyuznogo Khimicheskogo Obshchestva im D.I. Mendeleyeva, 1960, No. 5, Vol. 5, pp. 553-557

TEXT: Experimental work is carried out by Soviet scientists in the field of the glass-like state in alloys of chalcogenides of arsenic, antimony and thallium, for example (Fig.1). The alloys of arsenic and phosphorus selenides yield glass in the entire range of concentration, in sulfides - up to 50% phosphorus sulfide. Further studies were made on the interaction of arsenic sulfide and selenide, which were regarded as glass-forming agents, with the corresponding sulfides and selenides of certain metals of the I, II, III and IV groups of the periodic table (Ref. 15). Fig.2 shows one of the concentration triangles with respect to the arsenic-selenium-elements of the IV group system. Fig.3 and 4 give the experimental results in diagrammatic form re-

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S/063/60/005/005/008/021
A051/A029

Glass-Like Semiconductors

flecting the relationship of the glass-like state region and that of the investigated systems obtained by the above-mentioned author. These results indicated that a straight correlation between the region of vitrification and the position of the metal element in the periodic system could not be observed. Other authors, such as Zakhariyazen and Winter-Klein attempted to interprete the obtained results from the point of view of the criteria suggested for complex alloys based on oxides, but without success. A study of the chemical bond role in the vitrification laws carried out on the basis of available literature data and experimentally were partially described in the works of Refs. 14, 15 and lead to the conclusion that the necessary condition for vitrification is the presence of a covalent bond in substances, both in the solid state, as well as in the melted one. The author thinks that, based on the investigation of the structure of the chalcogenide glass in the systems arsenic-sulfur-selenium-tellurium by the method of X-ray-structural analysis (Ref. 17), the low-temperature thermal capacity (Ref. 18) and the measurements of viscosity, it can be assumed that these materials have a laminated chain-like structure with a covalent chemical bond within the chains and Van der Waals forces between the chains. The glass-like state is maintained also in significant destructions of the "stoichiometric" composition

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Glass-Like Semiconductors

in any of the chalcogenide glasses (Ref. 13). Several values of the conductivity are listed in the table for certain glasses of the systems depicted in Fig. 1. It was established that the spectral distribution of their internal photoeffect can change widely with a change in the composition. The temperature relationship of conductivity of all materials follows the ordinary exponential law. Measurements of the thermo-emf showed the presence of high values of the thermo-emf. The carrier sign in this case corresponded to the hole type of conductivity. It was also noted that the conductivity of the investigated glass-like semiconductors had a purely electronic nature. An assumption is made, based on the facts stated that with respect to the electrical properties there is no difference between crystalline and glass-like substances, and the presence of glass with semiconductive properties confirms the statement made by Academician Ioffe on the determining role played by the close-order in electrical properties of substances. The complex investigation of glass-like semiconductors, particularly in the system As_2Se_3-As_2Te_3, showed that with a change in the composition the conductivity value also changes within a wide range (Fig. 9), as well as the softening temperature (Fig. 10), the density (Fig. 11) and the optic absorption (Ref. 20). The conclusion is drawn that glass-like semiconductors combine the properties

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Glass-Like Semiconductors

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of both semiconductors and glass. Experiments have shown that glass, the composition of which lies far from the vitrification boundary, is quite stable to acids and alkalies and under normal conditions does not devitrify for a number of years. Glass-like semiconductors differ from crystalline ones in their electrical properties only by the apparent effect of small foreign admixtures and destruction of the stoichiometric composition and by the slight mobility of the charge carriers (Ref. 22,23). Chalcogenide glasses crystallize easily when heated to the softening temperature, whereby the electrical properties can undergo significant changes. A study of the temperature range to 300 and more degrees above the softening point showed that any changes in the law sequence which could indicate a change in the close-order were absent (Fig. 7). A study of the spectral distribution of the internal photoeffect confirmed the same fact. The author thinks that in the light of these facts one cannot expect a great change in the conductivity with a shift to the crystalline state to be determined by a change in the close-order, since the crystallization usually takes place below the softening temperature. One of the reasons for the enormous increase of the conductivity is given as being the different role played by the admixtures in the glass-like and crystalline states of the substance. This assumption was

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Glass-Like Semiconductors

confirmed experimentally. The experiment showed that as a result of the purification the conductivity in the crystalline state decreased by three orders and the hole conductivity was replaced by an electronic one. The author mentions various articles dedicated to the theory of liquids and amorphous bodies (Ref. 26-28). The photoelectric properties of these materials are used and they are also used for hermetically sealing of radio parts (Ref. 33). Special interest is shown in the low softening temperatures of this group of materials in this connection. The group of material described in this article has attracted special attention due to their transparency in the infrared region of the spectrum. There are numerous patents for infrared glass. At the present time, it has been established that in glass of the V_2O-P_2O_5-MeO system the conductivity can reach the high value of 10^{-5} ohm^{-1} · cm^{-1}. The fields of vitrification for the indicated system have been studied for the majority of oxides of the elements of the periodic system, as well as the relationship of the electrical properties to the composition (Ref. 36). The author points out that the oxide and chalcogenide semiconductors form a wide range of materials. Their high electronic conductivity permits one to conduct a more complex investigation which, in turn, can lead to a better understanding of the nature of the glass-like state. The ease

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Glass-Like Semiconductors

of crystallization of the chalcogenide glass renders it a valuable material for the study of the mechanism and kinetics of crystallization. There are 11 figures, 1 table, and 40 references: 27 Soviet, 9 English, 1 French, 3 German.

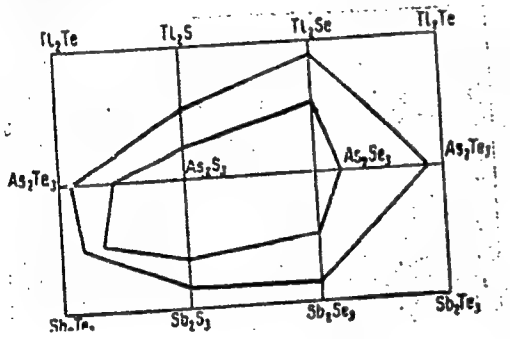

Figure 1:

Region of vitrification in alloys of thallium, arsenic, antimony, chalcogenides (internal polygon - conditions of gradual cooling, external polygon - conditions of hardening).

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23137
S/181/61/003/005/042/042
B111/B202

24,7100 (1153, 1160, 1136)

AUTHORS: Ivanov-Omskiy, V. I., Kiseleva, N. K., and Kolomiyets, B. T.

TITLE: Production of twin crystals of indium and gallium antimonides

PERIODICAL: Fizika tverdogo tela, v. 3, no. 5, 1961, 1621-1622

TEXT: The authors attempt to produce specimens with abruptly variable parameters by growing crystal twins from two semiconductors on the basis of intergrowth. The authors suspect that this intergrowth is a sufficient condition for the isomorphism of the mentioned compound. The twin crystals were prepared in the following way: The higher melting part of the twin crystal (gallium antimonide) is cut out from one piece; the indium antimonide is pulled from the melt and grows to the gallium antimonide. To study the structure, the authors cut out specimens perpendicular to the line of separation of the two components. The surface of the cut was microscopically analyzed. The separation line between In and Ga antimonides as well as the crystal structure on both sides of the line of separation could be distinctly discerned. It was observed that in polycrystalline seeding each nucleus of the Ga antimonide forms a nucleus in the In antimonide. As could be seen

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Production of ...

on the pictures of the cut the seeds of gallium antimonide consisted of some twin crystals (polysynthetic Ga antimonides). The In-antimonide grows to the Ga-antimonide in such a way that the direction of the twin plane and the number of twin crystals which is given by the seeding of gallium antimonide are conserved. There are 2 figures and two references: 1 Soviet-bloc and 1 non-Soviet-bloc .

ASSOCIATION: Fiziko-tekhnicheskiy institut imeni A. F. Ioffe AN SSSR Leningrad (Institute of Physical Technology imeni A. F. Ioffe AS USSR Leningrad)

SUBMITTED: January 2, 1961

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

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B109/B102

24,7600 (1043, 1137, 1164, 1035)

AUTHORS: Ivanov-Omskiy, V. I., and Kolomiyets, B. T.

TITLE: Thermomagnetic effects in n-type gallium antimonide and its alloys with indium antimonide

PERIODICAL: Fizika tverdogo tela, v. 3, no. 11, 1961, 3553-3555

TEXT: The longitudinal and transverse Nernst-Ettinghausen effects (N.-E. effects) were measured in the temperature interval from 100 to 500°K in n-type gallium antimonide at $H = 10^4$ oersteds by means of an apparatus described by O. V. Yemel'yanenko and N. V. Trishin (PTE, No. 1, 98, 1960). The results are shown in Fig. 1 and Fig. 2. Theoretically, they can be explained by the Sagar model (A. Sagar Phys. Rev., 117, 93, 1960). According to Sagar, the conduction band has two minima which, at room temperature, are separated by an energy gap of 0.08 ev. It can be demonstrated that therefore the solution of the kinetic equation has the form

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Thermomagnetic effects in n-type ...

(A)

$$a_n = \frac{3\sqrt{\pi}}{4} \frac{\Gamma\left(n+\frac{3}{2}\right)}{\Gamma^2\left(\frac{n}{2}+2\right)} ; \quad b = \frac{u_1}{u_2},$$

for the transverse N.-E. effect in a weak magnetic field. u_1 and u_2 denote the carrier mobility in the first and second band, N_1 and N_2 are the carrier concentrations, ΔE is the energy gap between the bands. The second term in the braces is independent of the dispersion mechanism and always positive for $b>1$. Studies made with the Sagar parameters showed that at relatively low temperatures this term is of great importance and determines the sign of the N.-E. effect. Since with 94% GaSb - 6% InSb the sign of the N.-E. effect obtained by the experimental measurements was positive, the band structures of GaSB and its alloys with InSb are

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Thermomagnetic effects in n-type ...

bound to be analogous. With 90% GaSb - 10% InSb the effect is, however, considerably weaker. This is explained by the fact that with increasing InSb portion the gap between the bands (000) and (111) increases. Hence the contribution of the electrons from the second band to the N.-E. effect becomes a smaller. For 50% GaSb - 50% InSb the N.-E. effect has a negative sign in a wide temperature range which is explained by the negligibly small contribution of the electrons from the (111) band. In general it holds that the distance between the minima is reduced with increasing GaIn portion. Hence, the sign of the N.-E. effect in GaSb and its alloys with small additions of InSb is independent of the electron dispersion mechanism. The authors thank degree student of LGU G. N. Popovich for calculations. There are 2 figures and 3 references: 1 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: A. Sagar. Phys. Rev., 117, 93, 1960; R. W. Keyes, M. Pollak. Phys. Rev., 118, 1001, 1960.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR Leningrad)

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Thermomagnetic effects in n-type ...

SUBMITTED: August 10, 1961

Fig. 1. Temperature dependence of the coefficient of the transverse N.-E. effect ($Q^{\perp}$). Legend: (1) GaSb; (2) 6% InSb - 94% GaSb; (3) 10% InSb - 90% GaSb; (4) 5% InSb - 50% GaSb.

Fig. 2. Temperature dependence of the coefficient of the longitudinal N.-E. effect ($Q^{\parallel}$). Legend: (1), (2) - as in Fig. 1; (3) 50% InSb - 50% GaSb.

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

KOLOMIETS, Boris T., prof., d-r.

Photoresistance in the automation and industry. Tekhnika 10 no.9:1-6 '61.

(Automation) (Photoelectricity)

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

TAUTS, Ya.[Tauc, Jan], prof.; MIKHAYLOVA, M.P.[translator]; KOLOMIYETS, B.T., red.; TELESNIN, N.L., red.; REZOUKHOVA, A.G., tekhn. red.

[Photoelectric and thermoelectric effect in semiconductors] Foto- i termoelektricheskie iavleniia v poluprovodnikakh. Pod red. B.T.Kolomiitsa. Moskva, Izd-vo inostr. lit-ry, 1962. 250 p. (MIRA 16:5)

(Semiconductors)

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

44305
S/058/62/000/012/043/048
A062/A101

9.4160

AUTHORS: Kolomiyets, Boris T., K"nev, Stefan

TITLE: Photoresistors in automation and industry

PERIODICAL: Referativnyy zhurnal, Fizika, no. 12, 1962, 26, abstract 12-3-521 ("Fiz.-matem spisaniye", 1961, 4, no. 4, 250 - 263, Bulgarian)

TEXT: Survey of general properties of photoresistors and their typical characteristics and practical applications. At present the industry already produces photoresistors to obtain sufficiently high currents up to 10 mA and more. These photoresistors are prepared from monocrystalline and pressed cadmium sulfide. Also laboratory samples are obtained having a linear dependence between the photocurrent and the illumination. The time constant of the existing types is of the order of 10^{-3} - 10^{-5} sec; the least inert are photoresistors made from lead sulfide which can be used for audio frequencies up to 10 kilohertz. Applications are considered for photorelays, automatic sorters, blocking devices, etc. The application of photoresistors in the polygraphic industry is described in more detail.

N. S.

[Abstracter's note: Complete translation]

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

41385

S/105/62/000/010/002/002
E192/E382

9.4160

AUTHORS: Kolomiyets, B.T., Doctor of Technical Sciences, Professor and Olesk, A.O., Candidate of Technical Sciences (Leningrad)

TITLE: Cadmium-selenide photoresistors, type ФС-А (FS-D)

PERIODICAL: Elektrichestvo, no. 10, 1962, 71 - 75

TEXT: The principal characteristics and parameters of cadmium-selenide photoresistors manufactured in the Soviet Union are described. Two types of resistor are currently made, both based on the same photosensitive element. This is made of polycrystalline cadmium selenide in the form of a disc, 8 mm in diameter and 0.5 - 0.8 mm thick. One of the surfaces of the disc is provided with two graphite electrodes deposited 4 mm apart so that the working surface is 7.5×4 mm^2. The elements have a maximum spectral sensitivity at the boundary between the visible and the infrared spectral regions (at about 0.7 μ). The current of the photoresistors is proportional to the square root of illumination and

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saturation does not occur even at 1 600 lux. On the other hand, for a given illumination the current is proportional to the voltage applied to the element. The sensitivity of the devices is very high and reaches 15 000 μA/luxV. Thus, for an illumination of 200 lux and an applied voltage of 50 V, the photocurrent is several mA. The lowest value of the dark resistance is 5×10^6 ohm but, in most cases, it is much higher. The noise level is 10-50 μV/V, the photocurrent and thus the sensitivity of the device decrease with increasing temperature, while the dark current increases as a function of temperature. The rise and decay times of the resistors, when operated with pulses, are of the order of 1 - 3 msec. The resistors are to some extent unstable during the first 200 - 300 hours of operation; their sensitivity decreases by about 30% during this period; afterwards, it is very stable. If the devices are to be operated under conditions of high humidity or in liquid media, they should be inserted in suitably hermetically-sealed capsules.

SUBMITTED: November 18, 1961
There are 8 figures and 1 table.

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33373
S/181/62/004/001/051/052
B112/B138

9.4177 (1635,1051)
26.2471

AUTHORS: Ivanov-Omskiy, V. I., and Kolomiyets, B. T.

TITLE: Carrier mobility and effective electron mass in fusions of indium and gallium antimonides

PERIODICAL: Fizika tverdogo tela, v. 4, no. 1, 1962, 299 - 302

TEXT: Since low effective mass and high mobility are characteristic of $A^{III}_{B}V$ compounds, these parameters were chosen to study the change in structure in solid solutions of such compounds. The InSb-GaSb fusions were produced by zone leveling. The compositions 32% InSb + 68% GaSb showed an excess donor concentration of $6 \cdot 10^{15} cm^{-3}$, and 10% InSb + 90% GaSb an excess donor concentration of $7 \cdot 10^{17} cm^{-3}$. The impurity concentrations varied between 10^{14} and $10^{16} cm^{-3}$. From conductivity, Hall effect and thermo-emf measurements, hole and electron mobility and electron effective mass were determined in dependence on composition. While μ remained almost independent of composition for holes, for electrons it decreased with increasing GaSb content. This curve is not far from linearity, which indicates that

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Carrier mobility and effective...

electron scattering from lattice imperfections plays a minor role in these solutions. The effective mass was calculated from thermo-emf measurements assuming electron scattering from acoustic phonons. Electron concentration was determined from the Hall effect. The following results were obtained:

InSb : GaSb in mole%	T, °K	n, cm^{-3},	m_n/m_o
100 : 0	315	$2.9 \cdot 10^{16}$	0.032
80 : 20	303	$1.05 \cdot 10^{16}$	0.035
50 : 50	277	$1.7 \cdot 10^{15}$	0.037
32 : 68	306	$6.1 \cdot 10^{15}$	0.044
10 : 90	310	$7.2 \cdot 10^{17}$	0.061
0 : 100	306	$6.2 \cdot 10^{17}$	0.22

The sudden increase in effective mass is attributed to the higher concentration of electrons and their scattering from ionized impurities. From the positive sign of both the transverse and longitudinal Nernst-Ettingshausen

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Carrier mobility and effective...

effects it can be seen that scattering from thermal lattice vibrations plays the main role in solutions with high GaSb content. The results indicate that in InSb-GaSb the scattering mechanism has several components, of which that from acoustic phonons is only one. There are 3 figures, 1 table, and 4 references: 3 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: A. Sagar. Phys. Rev. 117, 93, 1960.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad)

SUBMITTED: September 1, 1960 (initially), February 11, 1961 (after revision)

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34229

S/181/62/004/002/012/051
B102/B138

24.7700 (1035, 1043, 1055)

AUTHORS: Ivanov-Omskiy, V. I., Kolomiyets, B. T., and Chou-Huang

TITLE: Mobility and effective mass of holes in gallium antimonide

PERIODICAL: Fizika tverdogo tela, v. 4, no. 2, 1962, 383 - 387

TEXT: Hole mobility and effective mass were determined for 43 monocrystalline GaSb specimens ($12 \cdot 3 \cdot 1.5$ mm^3) from measurements of mobility, Hall effect and thermo-emf. The hole concentration of the specimens varied between $1.4 \cdot 10^{17}$ and $2.7 \cdot 10^{19}$ cm^{-3}. Knowing the position of the Fermi level from the thermo-emf, and the carrier concentration from Hall effect, the carrier mass can be calculated from the relation $\left(\frac{m_p}{m_0}\right)$ $= \left(\frac{\sqrt{\pi}}{4}\right)^{2/3} \left(\frac{h^2}{2\pi m_0 kT}\right) \left(\frac{n}{F_{1/2}(\bar{\eta})}\right)^{2/3}$. $\bar{\eta} = \eta/kT$, η - Fermi level, $F_r(\bar{\eta})$ $= \int_0^\infty \frac{x^r dx}{e^{x-\bar{\eta}} + 1}$; r is the exponent in the energy dependence of the electron

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Mobility and effective mass...

mean free path. For effective mass calculation the scattering mechanism has to be known. Calculations were made for the limiting cases r = 0 and r = 2. The m_p/m_o values obtained are between 0.66 and 0.98 for r = 0 and 0.17 - 0.31 for r = 2. The calculated figures only agree with the true values if one scattering mechanism prevails. Effective mass increases with the hole concentration; the same holds for electrons. The concentration dependence of hole mobility is explained by assuming different contributions from two scattering mechanisms: thermal lattice vibrations and impurity ions. Estimates of hole mobility for scattering from acoustic vibrations yield 1000 $cm^2/v \cdot sec$, and from polar vibrations 2300 $cm^2/v \cdot sec$. Good agreement with experimental data is obtained for μ_l = 1000 $cm^2/v \cdot sec$ and $m_p = 0.35\ m_o$. From measurements of the Hall mobility, $m_p = (0.35 \pm 0.04)m_o$ was found. For holes scattered from lattice vibrations only, Hall mobility was $(1200 \pm 100)cm^2/v \cdot sec$. The fact that thermo-emf and mobility measurements yield similar effective mass values indicates isotropy of the isoenergetic surfaces in the GaSb valence band. There are 3 figures, 1 table, and 14 references: 3 Soviet

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

and 11 non-Soviet. The four most recent references to English-language publications read as follows: D. Bolet, M. Menes. J. Appl. Phys., 31, 1426, 1960; C. Hilsum. Proc. Phys. Soc., 76, 414, 1960; L. R. Weisberg, J. B. Blanck. Bull. Am. Phys. Soc. 5, 62, 1960; T. S. Moss. Optical properties of Semiconductors. London, 1959.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad)

SUBMITTED: August 10, 1961

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34233
S/181/62/004/002/016/051
B102/B138

9.4160

AUTHORS: Kolomiyets, B. T., and Lyubin, V. M.

TITLE: Electrical and photoelectrical properties of antimony selenide layers

PERIODICAL: Fizika tverdogo tela, v. 4, no. 2, 1962, 401-406

TEXT: As_2Se_3 layers 0.4 - 3μ thick and of 99.998 and 99.99% purity were studied. They are of great interest for television-tube manu[illegible]. Ag, Al, Au, Pt and SnO_2 were used as electrode materials. Conductivity, photoconductivity, light absorption and polarization effects were studied with the usual methods and by the electron contact. Electron diffraction pictures taken by V. A. Dorin showed that the As_2Se_3 layers obtained by condensation in vacuo were amorphous. Hole-type conductivity was predominant. Dark resistivity varied between 10^{11} and 10^{13} ohm·cm. At fields $\mathcal{E} \leq 2 - 5 \cdot 10^4$ v/cm Ohm's law was satisfied, above these field strengths hyperlinear current increase was observed. For strong fields,

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Electrical and photoelectrical ...

$\sigma = \sigma_0 e^{m(\mathcal{E}-\mathcal{E}_0)}$. From the dark-current rise observed with rising temperature, the mean activation energy ΔE_d = 1.7 ev was calculated. Light absorption was found to decrease with increasing λ, almost vanishing at λ=700μ. The optical activation energy was ΔE_o = 1.76 ev. All the specimens prepared had a high photosensitivity between 300 and 700 mμ. For 100 lux illumination, the multiplicity factor of the resulting resistivity change reached 400-500. The illumination dependence of the photocurrent can be described by a law of the type $I_{ph}=AE^n$, A and n being constants. The lux-ampere characteristics were dependent on direction and polarity. In longitudinal measurements, n = 0.5 - 0.6 in transverse, n = 0.32 - 0.35 when the illuminated electrode was positive, and n = 0.7 - 0.75 when it was negative. For E < 5 lux, n was equal to 0.9 - 1.0 in all cases. The measurements were carried out with Pt and Al electrodes. The electrical and photoelectrical properties of these layers were not dependent on heat treatment up to 100°C nor on the prolonged (up to 2 years) influence of open air. The authors discovered that As_2Se_3 layers were polarizable and

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Electrical and photoelectrical ...

preserved this state for a long time. This polarization was much weaker in darkness than in light. The polarization effects were studied and the bound charge was estimated to be $1 - 5 \cdot 10^{-8}$ coul/cm^2. N. P. Rubanova is thanked for help. There are 7 figures and 13 references: 10 Soviet-bloc and 3 non-Soviet-bloc. The three references to English-language publications read as follows: H. Kallman, B. Rosenberg. Phys. Rev. 97, 1596, 1955; H. Kallman, J. Rennert. Electronics, 32, 39, 1959; M. Kikuchi, S. Jizima. J. Phys. Soc. Jap., 14, 856, 1959.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad)

SUBMITTED: August 17, 1961

Card 3/3

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

S/181/62/004/003/040/045
B101/B102

24,2600

AUTHORS: Andreychin, R., and Kolomiyets, B. T.

TITLE: The photo-electromotive force in arsenic chalcogenides

PERIODICAL: Fizika tverdogo tela, v. 4, no. 3, 1962, 814 - 815

TEXT: The dependence of photo-emf of the systems As_2S_3-As_2Se_3 and As_2Se_3-As_2Te_3 on their composition was examined. For this purpose a series of melts were studied in which sulphur was replaced by selenium and tellurium in increasing percentage: As_2S_3; $3As_2S_3 \cdot As_2Se_3$; $As_2S_3 \cdot As_2Se_3$; $As_2S_3 \cdot 3As_2Se_3$; As_2Se_3; $3As_2Se_3 \cdot As_2Te_3$; $As_2Se_3 \cdot As_2Te_3$; $As_2Se_3 \cdot 3As_2Te_3$; As_2Te_3. Al and Au electrodes (gap 0.5 mm) were condensed on the specimens in vacuo, the specimens were illuminated with 10,000 lux and the photo-effect was measured. Results: (1) the Al electrodes were always negative, the Au electrodes positive; (2) no photo-emf arose between electrodes of the same metal; (3) the increasing substitution of S by Se and Te was

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

24 2600

39133
S/058/62/000/006/091/136
A057/A101

AUTHORS: Kiseleva, N. K., Kolomiyets, B. T.

TITLE: On the role of admixtures in the internal photoeffect in CdTe and ZnTe

PERIODICAL: Referativnyy zhurnal, Fizika, no. 6, 1962, 38, abstract 6E304 (In collection: "Fotoelektr. i optich. yavleniya v poluprovodnikakh", Kiyev, AN USSR, 1959, 99 - 106)

TEXT: The effect of admixtures upon the electroconductivity and photoconductivity of CdTe and ZnTe crystals was investigated. The preparation method of crystals, alloyed with admixtures, by which CdTe crystals of the n-type can be obtained, is described. It is demonstrated, that the introduction of some admixtures (Sn and Ta) into CdTe effects a change in the sign of current carriers and changes strongly the spectral distribution of the internal photoeffect. The introduction of admixtures shifts the maximum photoconductivity to the short-wave range (460 mμ). In an analogous way acts also the disturbance of the stoichiometric ratio owing to a surplus of Cd. The investigation of the role of admix-

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On the role of...

tures in the photoconductivity of ZnTe indicates a qualitative coincidence with the case of photoconductivity in CdTe. It is assumed that the presence of the photoconductivity maximum in the depth of the absorption band indicates that the edge of the absorption band corresponds not to the basic, but to the admixture absorption of CdTe and ZnTe crystals.

V. Sidorov

[Abstracter's note: Complete translation]

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

S/109/62/007/006/021/024
D234/D308

9.4340

AUTHORS: Kolomiyets, B. T., Litvinova, E. M., Miselyuk, Ye. G., Tkhorik, Yu. A. and Shilo, V. P.

TITLE: Effect of fusible glass coating on the characteristics of germanium diodes

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 6, 1962, 1054-1055

TEXT: Three types of glass coatings on germanium diffusion diodes were tested: $As_2Se_3.I_{1.5}$; $As_2Se_3.Tl_2Se$; $2As_2S_3.Tl_2S$. The whole exposed surface of the semiconductor, including the p-n transition, was coated. A graph of a typical variation of V-A characteristics after coating is given. The characteristics so obtained were practically unchanged over many days. Glass coating is found to improve essentially the inverse branches of the characteristics. The effect of all three types of glass is nearly the same. Improvement of characteristics was also observed when the glass had been re-

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Effect of fusible ...

moved immediately after coating which disagrees with the result of other Soviet authors. There is 1 figure.

ASSOCIATION: Institut poluprovodnikov AN USSR; Fiziko-tekhnicheskiy institut im. A. F. Joffe AN SSSR (Institute of Semiconductors, AS UkrSSR; Physico-Technical Institute im. A. F. Joffe, AS USSR)

SUBMITTED: February 13, 1961

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APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

S/181/62/004/008/041/041
B108/B102

AUTHORS: Andriyesh, A. M., Kolomiyets, B. T., and Nazarova, T. F.

TITLE: Effect of iodine and germanium admixtures on the spectral distribution of the photoconductive effect in vitreous $TlAsSe_2$

PERIODICAL: Fizika tverdogo tela, v. 4, no. 8, 1962, 2286 - 2288

TEXT: The effect of iodine (up to 6.2 at-%) and germanium (up to 35 at-%) admixtures on the spectral distribution of the photoconductive effect and on the conductivity of vitreous $TlAsSe_2$ ($Tl_2SeAs_2Se_3$) was studied. Both iodine and germanium shift the maximum of photosensitivity to shorter wavelengths and increase conductivity. The activation energy increases, too. Germanium also increased the softening temperature of $TlAsSe_2$ which is attributed to the formation of covalent bonds between the chains and to an increase in bonding strength of the chains along which the carriers move. This effect was not observed when iodine was introduced. There are 2 figures.

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

S/181/62/004/008/041/041
B108/B102

Effect of iodine ...

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR Leningrad)

SUBMITTED: April 29, 1962 (initially),
May 10, 1962 (after revision)

Card 2/2

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

S/051/62/012/002/015/020
E202/E192

AUTHORS: Bashko, A., Prokopova, G., Kolomiyets, B.T., Pavlov, B.V., and Shilo, V.P.

TITLE: Absorption spectra of glasses of the As_2S_3-As_2Se_3 system

PERIODICAL: Optika i spektroskopiya, v.12, no.2, 1962, 275-277

TEXT: The purpose of this work was to extend the study of the absorption spectra of the above system to the region of 25 μ, so as to determine the wavelengths of all the absorption bands. The glasses were compounded according to the method given previously (Ref.4: B.T. Kolomiyets, N.A. Goryunova, ZhTF, 25, 1955, 984; B.T. Kolomiyets, N.A. Goryunova, V.P. Shilo, Tr. III Vsesoyuzn. soveshch. po stekloobrazn. sost. (Proceedings of the 3rd Conference on vitreous state) L., 1959). The following were prepared: As_2S_3; $5As_2S_3 \cdot As_2Se_3$; $2As_2S_3 \cdot As_2Se_3$; $As_2S_3 \cdot As_2Se_3$; $As_2S_3 \cdot 2As_2Se_3$; $As_2S_3 \cdot 5As_2Se_3$; As_2Se_3. Disc-shaped samples 20 mm in diameter and 0.15-3.0 mm thick were cut out, ground and

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

KOLOMIYETS, Boris Timofeyevich; FREGER, D.P., red.izd-va; GVIRTS, V.L., tekhn. red.

[Vitreous semiconductors] Stekloobraznye poluprovodniki. Leningrad, 1963. 42 p. (Leningradskii dom nauchno-tekhnicheskoi propagandy. Seriia: Poluprovodniki, no.3) (MIRA 17:3)

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

Effect of disturbance of short-range order on the electrical properties of solid solutions with tetrahedral structure of distribution of atoms. D. I. Tret'yakov.

Some electrical properties of solid solutions in the system $AgInTe_2$-2InSb. S. M. Mamayev, V. D. Prochukhan. (Presented by D. I. Tret'yakov--15 minutes).

(Paper not presented).]

Investigation of thermally stimulated current in vitreous $Tl_2Se \cdot As_2Te_3$. A. M. Andriyash, B. T. Kolomiyets.

Measurement of the mobility of current carriers in vitreous chalcogenide semiconductors. I. B. Ivkin, B. T. Kolomiyets, E. A. Lebedev.

Oxychalcogenide Glasses. B. T. Kolomiyets, V. P. Shilo. (Presented by B. T. Kolomiyets--20 minutes).

Report presented at the 3rd National Conference on Semiconductor Compounds, Kishinev, 16-21 Sept 1963

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

On some semiconducting properties of alloys of the system Si-As-S.
N. N. Yefseyeva, I. S. Kovaleva, B. T. Kolomiyets, K. S. Kranchevich.

Report presented at the 3rd National Conference on Semiconductor Compounds, Kishinev, 16-21 Sept 1963

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

3. Investigations of the solid solutions of the antimonides of indium and gallium. I. S. Baukin, V. I. Ivanov-Omskiy, B. T. Kolomiyets.

Report presented at the 3rd National Conference on Semiconductor Compounds, Kishinev, 16-21 Sept 1963.

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

Electrical properties of monocrystalline HgTe and its alloys with CdTe.
V. I. Ivanov-Omskiy, B. T. Kolomiyets, A. A. Mal'kova, V. K. Ozorodnikov, K. P. Smekalova. (Presented by V. I. Ivanov-Omskiy--15 minutes).

Notes: HgTe in semi-metallic; at 4°K the band overlap is ~ 0.05 eV, μ_h/μ_e = 50 to 100.

Report presented at the 3rd National Conference on Semiconductor Compounds, Kishinav, 16-21 Sept 1963

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

EWT(m)/T/EWP(t)/EWP(b)/EWA(c) JD

AUTHOR: Baukin, I. S.; Gavrilov, N. I.; Kolomiets, B. T.

...of equilibrium solid solutions by slow crystallization of the

...Azerbaydzhanskiy gosudarstvennyy ... Uchenyye zapiski.

... Liquid phase ...

...tion of equilibrium solid solutions by slow crystallization from the ... is applicable even for those compounds which ... decomposition during

the melt, in which the rate of diffusion is much greater than in the solid. Under

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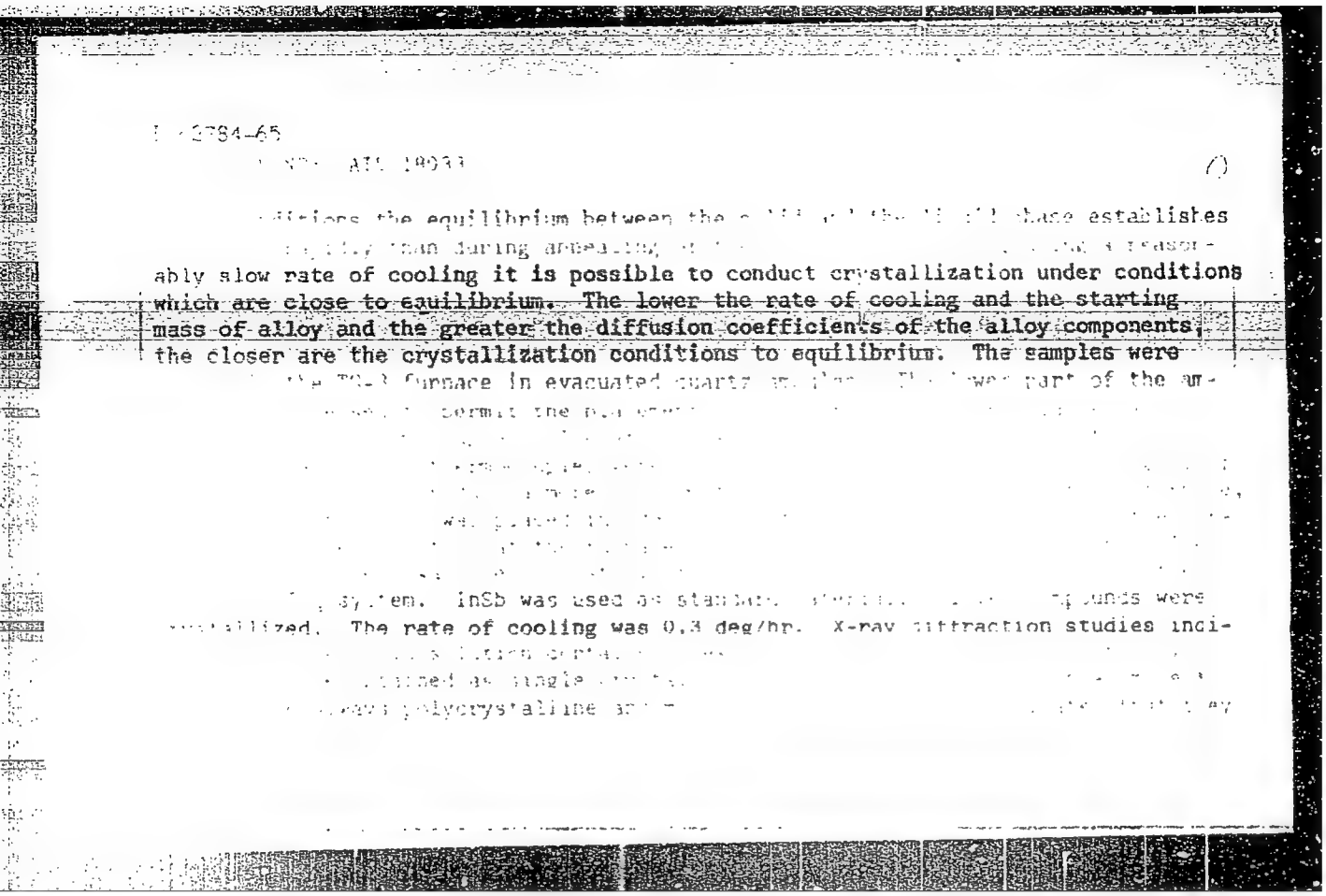

ably slow rate of cooling it is possible to conduct crystallization under conditions which are close to equilibrium. The lower the rate of cooling and the starting mass of alloy and the greater the diffusion coefficients of the alloy components, the closer are the crystallization conditions to equilibrium. The samples were

stallized. The rate of cooling was 0.3 deg/hr. X-ray diffraction studies indi-

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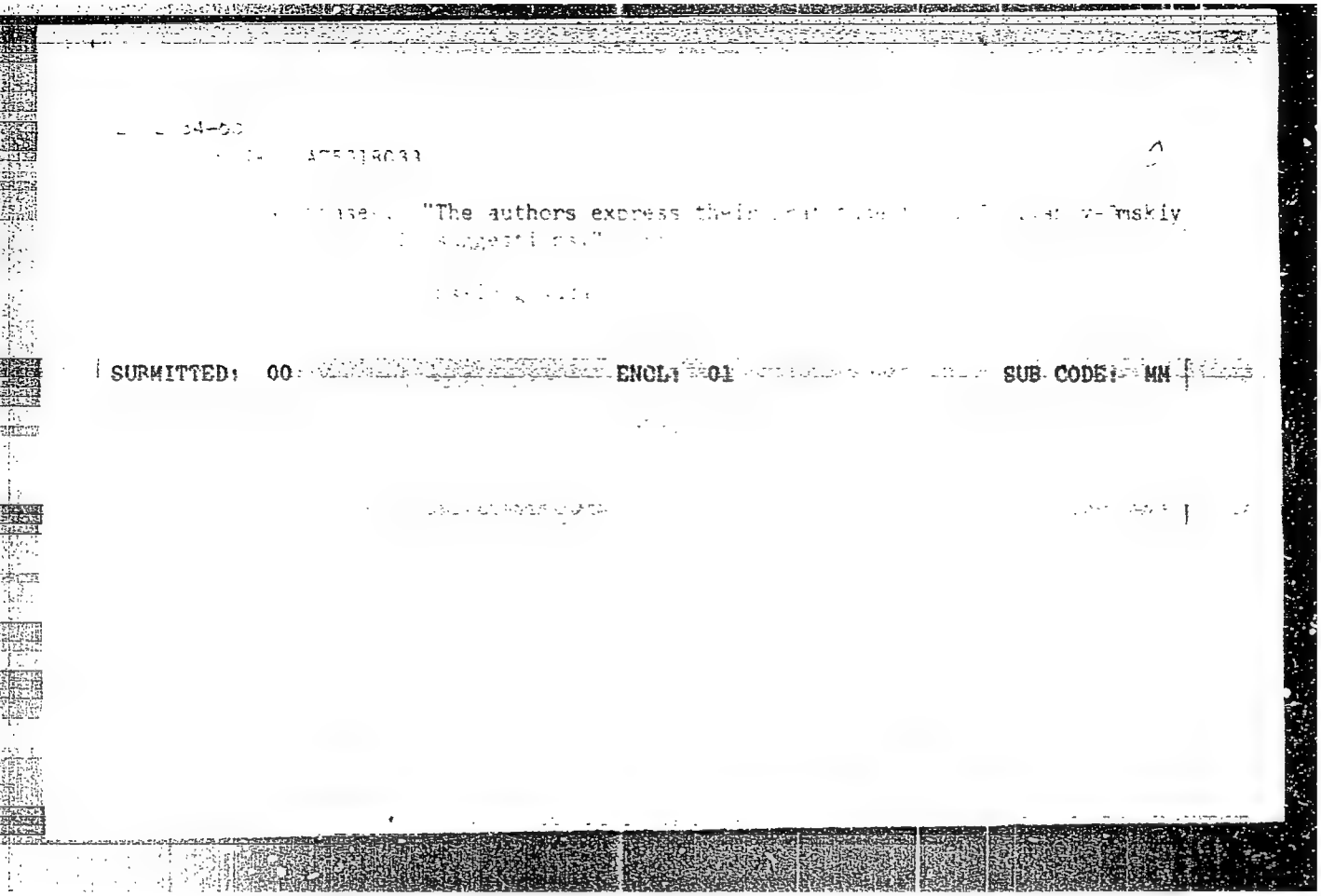

AT5718033

"The authors express their [illegible] V. Ivanskiy [illegible] suggestions."

SUBMITTED: 00 ENCL: 01 SUB CODE: MM

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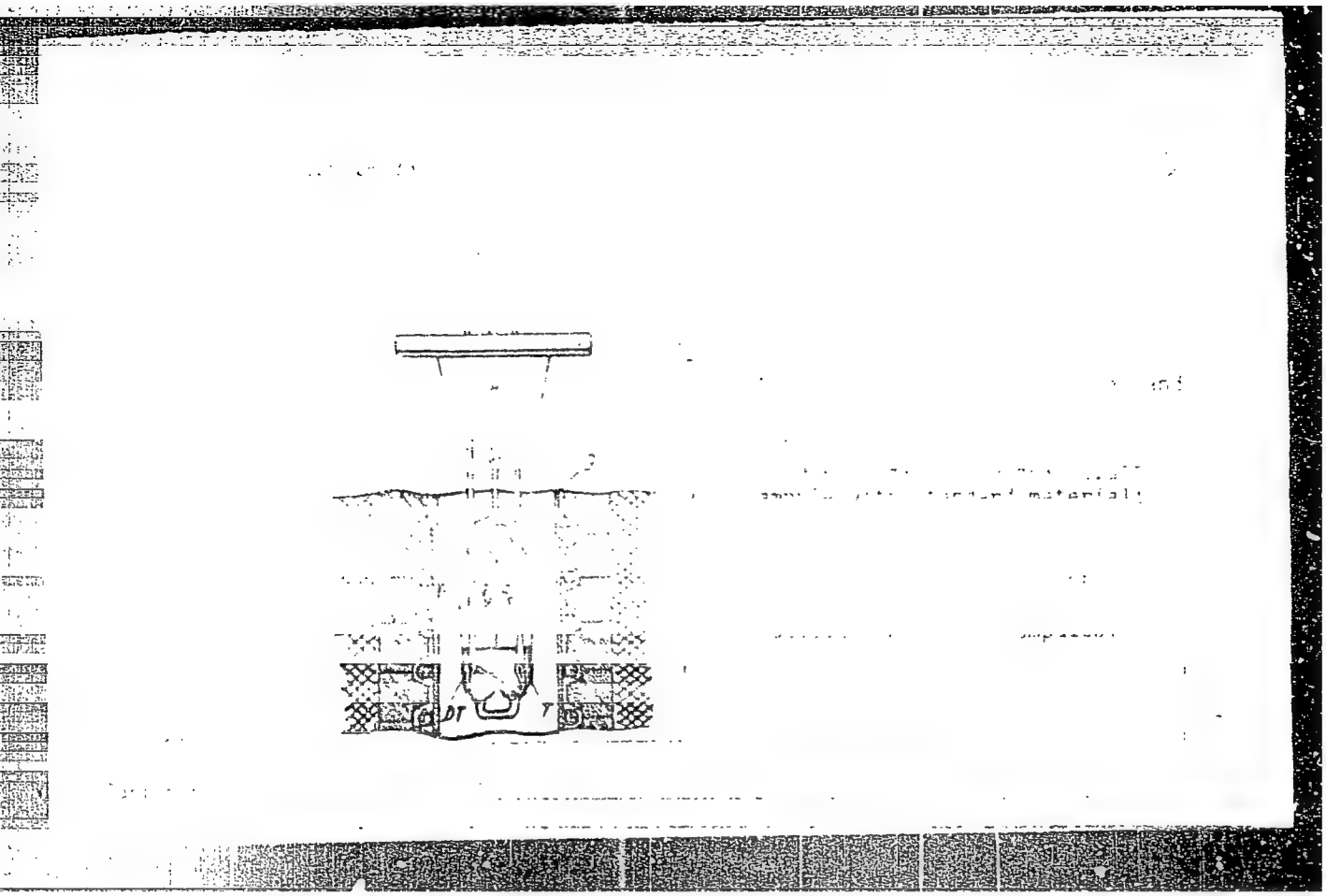

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

S/105/63/000/003/003/004
A055/A126

AUTHORS: Kolomiyets, B.T., Doctor of Technical Sciences, Professor; Olesk, A.O., Candidate of Technical Sciences (Leningrad)

TITLE: Cadmium sulphide photoconductive cells, type "ФСК" (FSK)

PERIODICAL: Elektrichestvo, no. 3, 1963, 75 - 80

TEXT: The main properties of the first polycrystal cadmium sulphide photoconductive cells were described by the authors in an earlier article (Elektrichestvo, 1956, no. 6). Several new and improved types of this photoconductive cell (types FSK-0, FSK-1, FSK-4, FSK-5, FSK-6, FSK-7, FSK-G1 and FSK-G2) are available now, all of which have the same basic properties (spectral sensitivity, inertness, etc.). The authors describe these properties on the example of the new FSK-1 type. The average specific sensitivity is $10 \cdot 10^3$ μamp/lum v (i.e., several times that of the old FSK-1 and FSK-2 types). The photocurrent, at an illuminance of 200 lux (luminous flux $\sim 6 \cdot 10^{-3}$ lum) and a voltage of 50 v, exceeds 2 mamp. At the same voltage, the dark current, measured 10 sec after the extinction of light, amounts to a few μamp only. The average statistical val-

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

Cadmium sulphide photoconductive cells ....

ue of the dark resistance is 3.3 10^6 ohm. In darkness, the cell withstands a voltage of about 2,000 v. A curve shows the dependence of the puncture voltage on the illuminance (at 200 lux, the puncture occurs at 800 v). Another curve shows the dependence of the current on temperature; the small dependence of the sensitivity on temperature is a salient feature of the new FSK cells. The time-constant amounts to several dozens of msec; it depends much on temperature; the inertness of the cell decreases at heating and increases at cooling. The frequency response of the cell is reproduced, as well as the curve showing its spectral sensitivity. The maximum sensitivity corresponds to the wavelength 0.64 - 0.65 μ; the red limit is in the region of 0.9 μ; the sensitivity of the new cells has thus been somewhat shifted towards the red region of the spectrum. The current-voltage characteristic is linear, save at small voltages; below 2 v, the current increases much more rapidly. Though having the same basic properties, the various new types of the cadmium sulphide cell differ in their design; some constructional data - namely shape and size of the photosensitive element, the size of the working photosensitive surface, the configuration of the electrodes and the distance between them - are given for each of the new types. The practical applications of the various types of the FSK cell (mainly

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

Cadmium sulphide photoconductive cells S/105/63/000/003/003/004
A055/A126

in photoelectric automation) are indicated. There are 11 figures and 4 tables.

SUBMITTED: November 18, 1961

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APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

BAUKIN, I.S.; GAVRILOV, N.I.; KOLOMIYETS, B.T.

- Preparation of equilibrium solid solutions by slow crystallization of the melt. Uch. zap. AGU. Ser. fiz.-mat. nauk no.2:99-103 '63.
(MIRA 18:1)

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

S/181/63/005/004/044/047
B102/B186

AUTHORS: Kolomiyets, B. T., and Mal'kova, A. A.

TITLE: Spectral distribution of absorption and of the photomagnetic effect in $Cd_xHg_{1-x}Te$ solid solutions

PERIODICAL: Fizika tverdogo tela, v. 5, no. 4, 1963, 1219 - 1220

TEXT: The Cd-Hg-Te system was chosen because of its narrow forbidden band (0.01 - 1.45 ev) and its great electron mobility. The transmission curves ($I/I_0 = f(\lambda)$) of single crystals of this alloy were measured in the wave length range 0.5 - 18 μ with plates of 70 - 100 μ thickness at room temperature for x = 0.5, 0.3, 0.2 and 0.1. Compared with the CdTe curve the other curves are shifted to greater λ with decreasing x, they become less steep and the saturation values attained are lower. HgTe pure is opaque for this range of wave lengths. From x=1 to x=0.2 the absorption band edge is shifted from 0.8 to 8-9 μ. The spectral distribution of the photomagnetic effect (Fig. 2) was measured with an ИКС-12 (IKS-12) spectrophotometer at room temperature and H_{const} = 8 koe. The effect was observed between 1 and

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

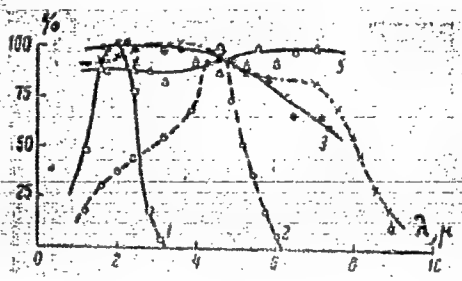
Spectral distribution of absorption...

9 μ. The photoconductivity spectral curves, when compared with that of the photomagnetic effect, are somewhat shifted toward shorter wavelengths. There are 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad)

SUBMITTED: December 20, 1962

Fig. 2. Ordinate: Photomagnetic emf. per unit energy, %.



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APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

KOLOMIYETS, B.T.; LEBEDEV, E.A.

Voltampere characteristics of a point contact with glass-type semiconductors. Radiotekh. i elektron. 8 no.12:2097-2098 D '63. (MIRA 16:12)

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

L 17972-63 EWP(q)/EWT(m)/BDS AFFTC/ASD Pq-4 WH/JD/RDW

ACCESSION NR: AP3000631 S/0181/63/005/005/1461/1465

AUTHORS: Andriyesh, A. M.; Kolomiyets, B. T.

TITLE: Local levels in glassy $Tl_2SeAs_2Te_3$

SOURCE: Fizika tverdogo tela, v. 5, no. 5, 1963, 1461-1465

TOPIC TAGS: semiconductor, forbidden band, $Tl_2SeAs_2Te_3$, dark conductivity

ABSTRACT: The authors describe the effect of preserving high dark conductivity as a result of short-period illumination of samples of glassy $Tl_2SeAs_2Te_3$ at low temperatures, and they present results of measuring thermoelectric currents in these samples. The method of preparing samples and testing them for homogeneity is the same as proposed by the same authors in "Novy*ye issledovaniya po poluprovodnikovy*m materialam," (Izd. "Kartea moldovenyaske," Kishinev, 1963). The samples were placed in a glass flask which was first evacuated and filled with nitrogen. Temperatures were measured by immersing the flask in a Dewar flask with liquid nitrogen and also by means of an electrical furnace placed within the flask. An EMU-3 electrometric amplifier and an EPPU-51M14 automatic recorder were employed to measure the current. The authors found that specimens cooled to a low temperature and then illuminated for a short period showed a much higher dark conductivity after cessation of

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ACCESSION NR: AP3000631

illumination than they possessed before the illumination. This increased dark conductivity did not alter significantly after a rather extended time (at least an hour). The phenomenon is fully reversible. Curves showing dependence of dark conductivity on temperature have a single slope for specimens not previously exposed to illumination, but show a change in slope for specimens previously illuminated. These experiments are explained by the existence of current-carrier traps in the forbidden band. The authors conclude that local levels occur in the forbidden band of such semiconductors. Orig. art. has: 4 figures and 1 formula.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSR, Leningrad (Physical and Technical Institute, Academy of Sciences, SSSR)

SUBMITTED: 16Jan63 DATE ACQ: 11Jun63 ENCL: 00

SUB CODE: PH NO REF SOV: 005 OTHER: 003

Card 2/2

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

KOLOMIYETS, B.T., doktor tekhn. nauk; SHILO, V.P., inzh.

Softening points of some chalcogenide glasses. Stek. i ker. 20 no.8:10-12 Ag '63. (MIRA 16:11)

1. Fiziko-tekhnicheskiy institut AN SSSR.

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

L 17897-63 EWP(q)/EWT(m)/BDS AFFTC/ASD Pg-4 WW S/0072/63/000/008/0010/0012
ACCESSION NR: AP3004688

AUTHOR: Kolomiyets, B. T. (Dr. of technical sciences); Shilo, V. P. (Engineer)

TITLE: Softening temperature of some chalcogenide glasses

SOURCE: Steklo i keramika, no. 8, 1963, 10-12

TOPIC TAGS: arsenic sulfide, arsenic selenide, thallium sulfide, thallium selenide, chalcogenide glass, thallium-arsenic-sulfur system, thallium-arsenic-selenium system, thallium-containing chalcogenide glass, germanium-containing chalcogenide glass, iodine-containing chalcogenide glass, iodine-containing chalcogenide glass, softening temperature, optical use, semiconductor-device sealing, chalcogenide-glass structure, softening-temperature rise, softening-temperature drop, glass stability, structure, semiconductor, optics

ABSTRACT: The changes in softening temperatures (T_g) of some chalcogenide glasses were studied in an effort to obtain materials with a wide range of such temperatures. Chalcogenide glasses with lower T_g than th se currently known could be used for sealing semiconductor devices, while chalcogenide glasses with high T_g are required for optical purposes. Several T_g were obtained by changing the

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stoichiometric composition of glasses of the Tl-As-S and Tl-As-Se systems and by introducing Ge or I into some of these glasses as additives. The glass-formation regions of these systems are shown in Fig. 1 of Enclosure. Samples were prepared by heating the requisite amounts of the elements in an evacuated and sealed quartz test tube to 700C (in case of Ge-containing compositions, to 900C) for 2 hr; the samples were then cooled to room temperature in the furnace. The softening temperatures were determined with Lazurkin's apparatus. The results indicate that an increase in the Tl_2S or Tl_2Se content of the glasses resulted in a noticeable T_g drop. Two glassy compounds were selected as starting materials for further study: $Tl_2S \cdot As_2S_3$ and $Tl_2Se \cdot As_2Se_3$. One-half to 2 germanium or 3 iodine atoms per molecule were introduced into As_2S_3, As_2Se_3, and $Tl_2Se \cdot As_2Se_3$. Germanium was introduced to strengthen the system by cross-linking it with covalent bonds to form a three-dimensional network structure. Iodine was added to weaken the system and shorten the chains of the original chain structure. In the presence of the additives T_g ranged from 30 to 450C for As_2S_3 and As_2Se_3 and rose from 109 to 214C for $Tl_2Se \cdot As_2Se_3$. The germanium-containing glasses were very stable, but those containing iodine seem to be unstable and evolve iodine spontaneously if the iodine content is high. The study indicated that T_g can be regulated to range from room temperature to 450C. Liquids can be obtained by introduction of iodine into arsenic sulfide or selenide. The results seem to confirm the chain

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ACCESSION NR: AP3004688

structure of the glasses. In connection with this structure, study of their electric properties is recommended. Orig. art. has: 1 figure and 3 tables.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Physicotechnical Institute, AN SSSR)

SUBMITTED: 00 DATE ACQ: 28Aug63 ENCL: 01

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12552-65 EWT(m)/EWP(b) AS(mp)-2 PDW/JD/MLK
S/0000/64/000/006/0057/0063

ACCESSION NR: AT4044563

AUTHOR: Andriyesh, A.M., Kolomiyets, B.T.

TITLE: The problem of current carrier mobility and effective mass in vitreous Tl sub 2 SeAs sub 2 Te sub 3

SOURCE: MSSR Institut fiziki i [illegible] Issledovaniya po poluprovodnikam; [illegible] Kishinev, Izd-vo Kartya Moldovenyaske, 1964, 57-63

TOPIC TAGS: current carrier mobility, semiconductor conductivity, [illegible] force, thallium semiconductor

ABSTRACT: A special amplifier, patterned after Yemel'yanenko and Trishin's device for measuring semiconductor electrical properties, was used in a study of the temperature dependence (from +70C down to -110C) of the electrical conductivity and thermal emf [illegible] alloy prepared from the individual components in quartz vacuum ampoules [illegible] proven to be homogeneous by tests of x-ray [illegible] and hardness and electrical conductivity. The electrical conductivity of the 3 x 3 x 100 mm samples with a 10-20C end-to-end temperature gradient was found to be 2.5×10^{-3} ohm^{-1}cm^{-1} at room

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ACCESSION NR: AT4044563

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temperature, decreasing exponentially with a decrease in temperature down to that of liquid nitrogen. The 930 μv/degree emf, found at room temperature, corresponds to a hole mechanism of conductivity and was found to be an inverse function of temperature, [illegible] a value of 1550 μv/degree at -100C. The effective mass of the holes was of the [illegible] of m_0, and the mobility of the holes was found to be roughly one order of magnitude greater than that of the electrons. The temperature dependence of both the emf and [illegible] conductivity are diagrammed. "The authors thank A A Vaypolin, who performed the x-ray structural analysis, V. P. Shilo, who performed the [illegible] structural [illegible], V. Yemel'yanenko, who gave valuable advice [illegible] orig art. has: 2 figures and 5 formulas.

ASSOCIATION: Institut fiziki i matematiki AN Mol SSR (Institute of Physics and Mathematics, AN Mol. SSR)

SUBMITTED: 13Dec63 ENCL: 00 SUB CODE: IC, EC

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APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

KOLOMIYETS, B. T.; MAMONTOVA, T. N.; LEBEDEV, E. A.; MAZETS, T. F.; STEPANOV, T. I.; LASHKAREV, V. Ye.; SALKOV, E. A.; SHEYNKMAN, M. K.

"Fast recombination processes in single crystals of CdS and CdSe."

report submitted for Intl Conf on Physics of Semiconductors, Paris, 19-24 Jul 64.

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

ACCESSION NR: AP4034909 S/0181/64/006/005/1325/1327

AUTHORS: Khodosevich, P. K.; Kolomiyets, B. T.

TITLE: The photoconductivity of selenium at low temperatures

SOURCE: Fizika tverdogo tela, v. 6, no. 5, 1964, 1325-1327

TOPIC TAGS: photoconductivity, trapping level, selenium, temperature dependence

ABSTRACT: The authors describe work on polycrystalline selenium in the range from room temperature down to the temperature of liquid nitrogen. The conductivity was measured both during illumination and in darkness after cessation of illumination. It was found that the photoconductivity increases with decrease in temperature and is proportional to applied voltage up to fields of 300 v/cm. The photoconductivity is saturated at rather low values of illumination. On removing the light, the increase in conductivity (produced at low temperatures) is preserved for long periods of time. This is explained by the presence of local levels, such as trapping levels, within the forbidden band of the selenium. When samples were warmed to room temperature and then cooled again, the dark resistance returned to its initial value. "Our assistants, I. K. Bandrovskaya, V. G. Romanov, and N. N.

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ACCESSION NR: AP4034909

Tsy*gel'naya, participated in the work." Orig. art. has: 4 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. I. Ioffe AN SSSR, Leningrad (Physicotechnical Institute AN SSSR); L'vovskiy torgovo-ekonomicheskiy institut (Lvov Institute of Trade and Economics)

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

ACC NR: AR6009954 SOURCE CODE: UR/0137/65/000/012/G052/G052

AUTHOR: Baukin, I. S.; Kolomiyets, B. T.

TITLE: Effect of the orientation plane of the seed on the increase of monocrystals of indium antimonide gallium antimonide alloys

SOURCE: Ref. zh. Metallurgiya, Abs. 12G363

REF SOURCE: Uch. zap. Azerb. un-t. Ser. fiz.-matem. n., no. 4, 1964, 97-99

TOPIC TAGS: ~~single crystal~~, indium antimonide, twinning, ~~indium gallium alloy~~ SINGLE CRYSTAL GROWTH, GALLIUM COMPOUND, ANTIMONIDE

ABSTRACT: The effect of the orientation plane of the seed (111) and ($\bar{1}\bar{1}\bar{1}$) on the growth of InSb single crystals with small additions of GaSb by the zone method has been investigated. The planes (111) and ($\bar{1}\bar{1}\bar{1}$) of the seed were preliminarily ground, polished and etched in a CP-4 (SR-4) diluted etching solution. The results obtained indicate that single crystals, grown with the seed and facing the melt with the plane (111), possessed twins. When the seed was oriented toward the melt with plane ($\bar{1}\bar{1}\bar{1}$), twins were not observed.

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

ACCESSION NR: AP4034929 S/0181/64/006/005/1457/1461

AUTHOR: Ivanov-Omskiy, V. I.; Kolomiyets, B. T.; Mal'kova, A. A.

TITLE: Optical and photoelectric properties of HgTe, and its alloys with CdTe

SOURCE: Fizika tverdogo tela, v. 6, no. 5, 1964, 1457-1461

TOPIC TAGS: HgTe, HgTe--CdTe alloys, optical properties, photoelectric properties, photosensitivity

ABSTRACT: The nature of the photosensitivity of HgTe and of $Cd_xHg_{1-x}Te$ specimens is discussed on the basis of measurements of their optical and photoconductive properties. Experiments were conducted with p-type specimens with an acceptor concentration of 10^{17}—10^{18} cm^3[sic] [10^{17}—10^{18} cm^{-3}]. Transmission and reflection were measured at 150 and 300C at 1—25μ on the IKS-12 spectrometer with the IPO-12 attachment, and the absorption coefficients were determined from the data obtained. The photoconductive properties

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were studied with equipment described by B. T. Kolomiets and A. A. Mal'kov (FTT, 5, 1219, 1963). The photomagnetic effect was measured in magnetic fields of 500—20,000 oe, and the photoconductivity in electric fields of 5—15 v/cm. The experimental results are given in the text. Optical data indicate that specimens with a low HgTe content (x>0.2) are semiconductors, and those with a high HgTe content are semimetals. The photosensitivity of the specimens has a complex nature. In HgTe and in its alloys with a high HgTe content (x<0.2) the photosensitivity is caused by the Nerust effect; the bolometric effect is insignificant. Photoconductivity and the Kikoin-Noskov effect appear with an increase in the CdTe content; they prevail in specimens with x>0.25. Thus, specimens with a high HgTe content are semiconductors whose band width decreases with an increase in the HgTe content. The optical and semiconductive properties of alloys with a high HgTe content can be explained by the semimetallic nature of the conductivity. Orig. art. has: 2 formulas and 3 figures.

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

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ASSOCIATION: Fiziko-tekhnicheskiy institut imeni A. F. Ioffe, AN SSSR, Leningrad (Physicotechnical Institut, AN SSSR).

SUBMITTED: 03Dec63 DATE ACQ: 20May64 ENCL: 00

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"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823920006-1

ACCESSION NR: AP4041364 S/0048/64/028/006/1000/1001

AUTHOR: Baukin, I. S.; Ivanov-Omskiy, V. I.; Kolomiyets, B. T.

TITLE: Single crystals of indium antimonide-gallium antimonide alloy and their electrical properties

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 28, no. 6, 1964, 1000-1001

TOPIC TAGS: indium antimonide, gallium antimonide, antimonide alloy, alloy single crystal, single crystal property, electrical property

ABSTRACT: Single crystals of indium antimonide alloyed with small amounts [unspecified] of gallium antimonide have been grown by the zone-melting method using a single crystal seed. The two alloys prepared had lattice constants of 6.470 and 6.461 Å, respectively, and identical electron concentration ($3 \cdot 10^{15}$ e/cm^3) and electron mobility (98,000 cm^2/v·sec). The crystals were used to study optical absorption and reflection for wavelengths in the 6—25-μ range, and to determine the mechanism of the change of the forbidden zone width ΔE with changing alloy composition. The theoretically calculated ΔE in

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